

False Rubicons, Moral Panic, & Conceptual Cul-De-Sacs: Critiquing & Reframing the Call to Ban Lethal Autonomous Weapons

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Abstract

By casting into the indeterminate future and projecting visions of so-called killer robots, The Campaign to Stop Killer Robots (The Campaign) has incited moral panic in an attempt to stimulate a discussion—and ultimately a ban—on lethal autonomous weapons (LAWS). The Campaign’s efforts have been superficially successful, but have come at a substantive cost. In an effort to shift the circular dialogue toward constructive discussions on the interaction between human and machine abilities in weapon systems, this article explores the conceptual paradox implicit in The Campaign.

The call for a ban provokes the international community to envision future, dire harm from LAWS. It attempts to ban not only future “fully

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autonomous” weapons systems, which do not (and may never) exist, but also some unspecified portion of current weapons systems. The real concern is the weapon systems’ autonomy in certain functions—selecting and engaging targets. However, weapons systems that perform these functions without human intervention have been employed internationally since 1980. Despite its attempts to foster panic, The Campaign is unable to specify which current system should be included in the ban. As a result, the LAWS debate remains stagnant.

This article explains autonomy in general and as applied to weapons systems. It examines The Campaign’s primary source documents, reports on LAWS by the Human Rights Watch and a United Nations Special Rapporteur. After discussing the flaws with The Campaign’s approach, this article proposes an alternative moratorium on LAWS primarily designed to lethally target personnel.

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INTRODUCTION

In 49 B.C., Julius Caesar halted his army on the banks of the Rubicon River in northern Italy. According to Suetonius, he paused in momentary hesitation, before sweeping across the waters toward Rome with the immortal phrase *Alae iacta est* (The die has been cast). By violating an ancient Roman law forbidding any general to cross the Rubicon with an army, Caesar's decision made war inevitable. Ever since, "crossing the Rubicon" has come to symbolize a point of no return, when the time for deliberation is over and action is at hand.¹

According to an increasingly vocal chorus, the international community of today is similarly poised on the banks of a new and different, but equally emblematic, Rubicon.² This contemporary point of no return is fraught with unalterable consequences on the very "ability of the international legal system to preserve a minimum world order."³ This modern day Rubicon takes the form of the international community's decision on whether to develop and employ lethal autonomous weapons systems (LAWS)—the hallmark of which is the capability to "select and engage targets without further human intervention."⁴

The chorus is orchestrated by the Campaign to Stop Killer Robots (The Campaign), "a global coalition [comprised] of 61 international, regional, and national non-governmental organizations (NGOs) in 26 countries."⁵ Developed in 2012 and formally launched in 2013, The Campaign has

1. Dominic D.P. Johnson & Dominic Tierney, *The Rubicon Theory of War: How the Path to Conflict Reaches the Point of No Return*, 36 INT'L SECURITY 7, 7 (2011) (citing C. Suetonius, LIVES OF THE CAESARS, VOLUME 1: JULIUS, AUGUSTUS, TIBERIUS, GAIUS, CALIGULA (J.C. Rolfe trans., Harv. Univ. Press 1989)).

2. See *infra* notes 5–6 and accompanying text.

3. Christof Heyns (Special Rapporteur), *Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions*, ¶ 110, U.N. Doc. A/HRC/23/47 (Apr. 9, 2013) [hereinafter *SR Report*].

4. *Id.* at 1. But as this article discusses, how to define LAWS, when in the negotiating process they should be defined, and even if a definition is feasible, are all unresolved and debated questions. See discussion *infra* Part II.

5. See *Who We Are*, CAMPAIGN TO STOP KILLER ROBOTS, <http://www.stopkillerrobots.org/> (last visited Oct. 6, 2016). Constituent parts of what would become The Campaign began efforts to raise awareness in 2008. *Chronology*, CAMPAIGN TO STOP KILLER ROBOTS, <http://www.stopkillerrobots.org/chronology/> (last visited Nov. 1, 2016).

lobbied the States Parties to the Convention on Certain Conventional Weapons (CCW) to adopt a protocol prohibiting LAWS.⁶ In essence, The Campaign has called for the international community to collectively agree to not cross the LAWS' Rubicon.⁷

Principally underpinning The Campaign's clarion call are two sources: a 2012 report produced by Human Rights Watch and the International Human Rights Clinic at Harvard Law School—*Losing Humanity: The Case Against Killer Robots (Losing Humanity)*,⁸ which called for a ban on LAWS, and a 2013 report by the United Nations Special Rapporteur on extrajudicial summary or arbitrary executions (*SR Report*), which called for a moratorium.⁹

6. *Nations Agree to Take on Killer Robots!*, CAMPAIGN TO STOP KILLER ROBOTS, <http://www.stopkillerrobots.org/2013/11/ccwmandate/> (last visited Nov. 1, 2016) [hereinafter *Nations Agree*]. The CCW's full title is the "Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects as amended on 21 December 2001" though it's commonly referred to as CCW. See *The Convention on Certain Conventional Weapons*, UNITED NATIONS OFF. GENEVA, [http://www.unog.ch/80256EE600585943/\(httpPages\)/4F0DEF093B4860B4C1257180004B1B30?OpenDocument](http://www.unog.ch/80256EE600585943/(httpPages)/4F0DEF093B4860B4C1257180004B1B30?OpenDocument) (last visited Oct. 25, 2016) [hereinafter CCW Website]. There are currently 121 states parties to CCW, the purpose of which is "to ban or restrict the use of specific types of weapons that are considered to cause unnecessary or unjustifiable suffering to combatants or to affect civilians indiscriminately." *Id.* There are five Protocols to the CCW: (I) non detectable fragments; (II) mines, booby traps, and other devices; (III) incendiary weapons; (IV) blinding laser weapons, and (V) explosive remnants of war. *Id.*

7. The Campaign calls for a "comprehensive, pre-emptive prohibition on the development, production and use of fully autonomous weapons." *The Solution*, CAMPAIGN TO STOP KILLER ROBOTS, <http://www.stopkillerrobots.org/the-solution/> (last visited Oct. 25, 2016). At the same time, The Campaign also calls on all countries to implement the *SR Report*'s recommendation for a moratorium on what it refers to as lethal autonomous robots (LARs). *Id.* But the lack of specificity in how the *SR Report* defines LARs renders the subject of the proposed moratorium unclear. *Id.*

8. *Losing Humanity: The Case Against Killer Robots*, HUM. RTS. WATCH (Nov. 2012), http://www.hrw.org/sites/default/files/reports/arms1112ForUpload_0_0.pdf [hereinafter *Losing Humanity*].

9. *SR Report*, *supra* note 3, ¶ 118. In 2016, the Special Rapporteur issued a report recommending that "[a]utonomous weapons systems that require no meaningful human control should be prohibited." Maina Kiari (Special Rapporteur to the Human Rights Council) & Christof Heyns (Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions), *Joint Report of the Special Rapporteur on the Rights to Freedom of Peaceful Assembly and of Association and the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions on the Proper Management of Assemblies*, ¶ 67(f), U.N. Doc A/HRC/31/66 (Feb. 4, 2016). This article focuses on the Special Rapporteur's 2013 Report, because it remains, along with *Losing Humanity*, one of the two source documents that The Campaign contends explain the problem of killer robots. *The Problem*, CAMPAIGN TO STOP KILLER ROBOTS, <http://www.stopkillerrobots.org/the-problem/> (last visited Oct. 6, 2016).

The implicit—if not explicit—message of both source documents is similar, metaphorically anyway, to that associated with Caesar—to cross this Rubicon, to develop LAWS,¹⁰ would lead to the most drastic of outcomes from which there can be no turning back.¹¹ *Losing Humanity* warns that developing LAWS will inevitably result in unsupervised killer robots, which “could one day have the ability to make such choices under their own power.”¹² And the *SR Report* cites LAWS as “tireless war machines,” which would act as a “form of mechanized pesticide,” treating humans like “vermin.”¹³

Comparing Caesar crossing the Rubicon with the international community developing and employing LAWS is possible in part, because both *Losing Humanity* and the *SR Report* reduce LAWS to a future, binary decision.¹⁴ The international community will either cross the Rubicon and develop LAWS, or it won’t.¹⁵ And both source documents are steadfast in the view that the international community must not cross.¹⁶

The similarities between the Rubicon and The Campaign’s narrative are intriguing, but in unexpected ways. In addition to a shared fondness for evocative language, both are, if not false, then reliant on revisionist or selective history. And fascinatingly, what’s more likely to have *actually* happened vis-à-vis Caesar and the Rubicon is an even more apt metaphor for what is actually happening (and has happened) with LAWS; a reality quite different than that portrayed by The Campaign.

Caesar is unlikely to have crossed the Rubicon in any way similar to the stirring rendition so often described.¹⁷ He wasn’t on horseback, pausing at

10. As discussed in this article, LAWS, Killer Robots, and LARs, while differing in significant aspects of their meaning, all include weapons that can select and engage targets without further human intervention. See *infra* Part II.

11. See *infra* Section III.C.

12. *Losing Humanity*, *supra* note 8, at 1.

13. *SR Report*, *supra* note 3, ¶¶ 95, 109. As discussed in this article, the issue of LAWS is not lacking for hyperbole. See, e.g., Stuart Russell, *Take a Stand on AI Weapons*, 521 NATURE 415, 416 (2015), <http://www.nature.com/news/robotics-ethics-of-artificial-intelligence-1.17611>. For one of any number of examples, in 2015, a University of California computer science and engineering professor (and former department chair) claimed that we “can expect [LAWS] deployed in the millions, the agility and lethality of which will leave humans utterly defenceless.” *Id.*

14. See *Losing Humanity*, *supra* note 8; *SR Report*, *supra* note 3; see also *infra* Sections III.B–C.

15. See *infra* Section III.C.

16. See *Losing Humanity*, *supra* note 8; *SR Report*, *supra* note 3.

17. Robert Morstein-Marx, *J. Reuben Clark III Lecture: Did Caesar Cross the Rubicon?*, BYU HUMAN. (Apr. 2, 2015), <http://humanities.byu.edu/j-reuben-clark-iii-lecture-did-caesar-cross-the->

the banks before leading the XIII Legion in fording the Rubicon during the day.¹⁸ He was in a carriage, on a road, and crossed the river at night as part of a thirty-mile journey.¹⁹ It's not even clear that Caesar's individual crossing of the Rubicon constituted a violation of Roman law.²⁰ Finally, Caesar did not make dramatic pronouncements while crossing the river; if anything, the die had already been cast.²¹

Before Caesar had even set out on his night's carriage ride, he had already sent across the river a small body of men bearing arms under civilian dress whose mission was to enter the city at night and ensure it did not close its gates to their commander when he arrived.²²

At the time, Caesar crossing the Rubicon was neither dramatic nor notable. It only became so through subsequent creative license and language.²³

Similarly, the decision to employ LAWS is not looming—the international community crossed that Rubicon *decades* ago.²⁴ Over thirty countries have employed autonomous weapons systems of one type or another and as far back as 1980.²⁵

rubicon/ [hereinafter Morstein-Marx, *Did Caesar Cross the Rubicon?*]. Morstein-Marx, a classics professor, contends that the historical account, recorded some twenty years after its purported occurrence, is “dubious history,” but that “[b]y having Caesar announce that he’s fully and counterfactually aware of the terrible consequences that will follow from his action” renders it tragically poignant. *Id.*; see also Robert Morstein-Marx, *Caesar’s Alleged Fear of Prosecution and His “Ratio Absentis” in the Approach to the Civil War*, 56 HISTORIA: ZEITSCHRIFT FÜR ALTE GESCHICHTE 159 (2007) [hereinafter Morstein-Marx, *Caesar’s Alleged Fear of Prosecution*] (critiquing the belief that Caesar feared prosecution if he returned to Italy); G.R. Stanton, *Why Did Caesar Cross the Rubicon?*, 52 HISTORIA: ZEITSCHRIFT FÜR ALTE GESCHICHTE 67 (2003) (contending that fear of prosecution was very much a motivating factor).

18. See Morstein-Marx, *Did Caesar Cross the Rubicon?*, *supra* note 17.

19. *Id.*

20. *Id.*

21. *Id.*

22. *Id.*

23. *Id.*

24. INT’L COMM. RED CROSS, AUTONOMOUS WEAPON SYSTEMS: TECHNICAL, MILITARY, LEGAL AND HUMANITARIAN ASPECTS 61, 85, 92 n.227 (2014), <https://www.icrc.org/en/document/report-icrc-meeting-autonomous-weapon-systems-26-28-march-2014> [hereinafter ICRC REPORT].

25. *Id.* at 65 (noting that the vast majority of these weapons systems are designed to target material, aircraft, vessels at sea, and inbound missiles). Paul Scharre and Michael Horowitz, in a 2015 working paper, listed sixteen “[s]elected [e]xamples of [h]uman-[s]upervised [a]utonomous [w]eapon [s]ystems.” Paul Scharre & Michael Horowitz, *An Introduction to Autonomy in Weapon*

While the recasting of the ancient Roman story isn't particularly problematic,²⁶ the same cannot be said for The Campaign's efforts. Framing the debate in terms of killer robots has rocketed LAWS onto the international stage while dooming the discussions such framing engendered.²⁷

This article explores that parasitic symbiosis by critiquing The Campaign's source documents, *Losing Humanity* and the *SR Report*.²⁸ Both documents, and The Campaign itself, attempt to incite moral panic²⁹ in order to stimulate a discussion and ultimately, a ban on LAWS.³⁰ They do so by casting into the indeterminate future³¹ and projecting visions of so-called killer robots.³² These marketing efforts have succeeded on several levels.³³ Academics,³⁴ a host of Nobel Laureates,³⁵ and NGOs from around the world

Systems 21 (Ctr. for a New Am. Sec. Working Paper, 2015). Other estimates are that "[a]s many as 40 nations are currently developing military robotics" and "[s]ome weapons already in use may be considered 'autonomous.'" Steven Gross, *The U.S. Should Oppose the U.N.'s Attempt to Ban Autonomous Weapons*, HERITAGE FOUND. (Mar. 5, 2015), <http://www.heritage.org/research/reports/2015/03/the-us-should-oppose-the-uns-attempt-to-ban-autonomous-weapons>.

26. Indeed, the story, while perhaps apocryphal, "may actually speak to us even more profoundly than a more historically correct version, since we too have observed in our own lifetime catastrophes of human judgment whose possible consequences we might have pause to think over a little bit longer." Morstein-Marx, *supra* note 17.

27. See *infra* Section III.B.

28. See *infra* Part III.

29. Moral panic is "exaggerated or misdirected public concern, anxiety, fear, or anger over a perceived threat to social order." Charles Krinsky, *Introduction: The Moral Panic Concept* in *THE ASHGATE RESEARCH COMPANION TO MORAL PANICS* 1, 1 (Charles Krinsky ed., Ashgate Publ'g Ltd. 2013).

30. See *infra* Part III.C.

31. See, e.g., *Losing Humanity*, *supra* note 8, at 1 (claiming that killer robots "could be developed within 20–30 years.").

32. As one of the authors of the term "killer-robots" noted: "no government wants to be seen as pro-killer-robot." Rose Eveleth, *So What Exactly Is a 'Killer Robot'?*, ATLANTIC (Aug. 20, 2014), <http://www.theatlantic.com/technology/archive/2014/08/calling-autonomous-weapons-killer-robots-is-genius/378799/> (quoting Mary Wareham, coordinator of The Campaign). Eveleth contends that The Campaign "has gained momentum as the technology and militarization of robotics has advanced, and the smartest thing the movement has done is pick its name. 'Killer robots' still isn't a well-defined term, but it's clearly a winning one." *Id.*

33. See *infra* notes 34–41.

34. See *Chronology*, *supra* note 5. In July 2015, a group of robotics and artificial intelligence researchers added their voices to the cause, but in the process further demonstrated how confusing the LAWS issue is. See *Autonomous Weapons: An Open Letter From AI & Robotics Researchers*, FUTURE LIFE INST. (July 28, 2015), <http://futureoflife.org/open-letter-autonomous-weapons/> [hereinafter *Autonomous Weapons*]. The letter calls for a ban, but only on offensive autonomous

have added their support.³⁶ The Campaign has continued to grow and has expanded its efforts by using public outreach,³⁷ engaging elected officials,³⁸ and encouraging states³⁹ and private companies⁴⁰ to agree to a ban. And in 2013, States Parties to the CCW agreed that LAWS were within the treaty's mandate.⁴¹

Yet despite this rapidly gained, seemingly unstoppable momentum, all that has occurred at CCW LAWS meetings are confused and circular discussions about terminology and agreements to future discussions.⁴²

weapons, and even then only on those that are beyond meaningful human control. *Id.* This call makes The Campaign's proposal seem coherent in contrast. *See id.* The signatories of the open letter include Stephen Hawking, Steve Wosniak, and Elon Musk. *See id.* Hawking and Musk would fit right in The Campaign's moral panic department. *See supra* note 29. Hawking has predicted that advancements in artificial intelligence (AI) "spell the end of the human race," while Musk claims AI "could be far more dangerous than nuclear weapons" and compared it to "summoning a demon." *See* Patrick Tucker, *The Military's New Year's Resolution for Artificial Intelligence*, DEFONE (Dec. 31, 2014), <http://www.defenseone.com/technology/2014/12/militarys-new-years-resolution-artificial-intelligence/102102/>. Interestingly, The Campaign "welcome[d]" the letter, which The Campaign described as "calling for a ban on autonomous weapons." *Artificial Intelligence Experts Call for a Ban*, CAMPAIGN TO STOP KILLER ROBOTS, <https://www.stopkillerrobots.org/2015/07/aicall/> (last visited Oct. 6, 2016). Yet as described above, the open letter does not call for a ban on autonomous weapons writ large, but only the subset categories of (1) offensive autonomous weapons, (2) which are beyond meaningful human control. *See Autonomous Weapons, supra*.

35. *See Nobel Laureates Call for Killer Robots Ban*, CAMPAIGN TO STOP KILLER ROBOTS, <https://www.stopkillerrobots.org/2014/06/nobelpeace/> (last visited Oct. 26, 2016).

36. *See Who We Are, supra* note 5.

37. *See Public Outreach in the Netherlands*, CAMPAIGN TO STOP KILLER ROBOTS (Sept. 30, 2014), <https://www.stopkillerrobots.org/2014/09/netherlands/> (describing community engagement efforts in the Netherlands); *Stop Killer Robots (@BanKillerRobots)*, TWITTER, <https://twitter.com/BanKillerRobots> (last visited Oct. 26, 2016); *Campaign to Stop Killer Robots*, FACEBOOK, <https://www.facebook.com/stopkillerrobots> (last visited Oct. 26, 2016).

38. *See Congressional Briefing on Killer Robots*, CAMPAIGN TO STOP KILLER ROBOTS (July 17, 2014), <https://www.stopkillerrobots.org/2014/07/uscongress/> (describing The Campaign's U.S. lobbying efforts).

39. By the conclusion of the April 2016 CCW LAWS meetings, fourteen States had joined The Campaign's call for a ban. *Ban Support Grows, Process Goes Slow*, CAMPAIGN TO STOP KILLER ROBOTS (Apr. 15, 2016), <https://www.stopkillerrobots.org/2016/04/thirdmtg/> (listing Algeria, Bolivia, Chile, Costa Rica, Cuba, Ecuador, Egypt, Ghana, Holy See, Mexico, Nicaragua, Pakistan, State of Palestine, and Zimbabwe).

40. *Company Pledges It Won't Develop Killer Robots*, CAMPAIGN TO STOP KILLER ROBOTS (Aug. 13, 2014), <https://www.stopkillerrobots.org/2014/08/clearpath/> (explaining the purported first-ever company pledge to not develop killer robots).

41. *Background—Lethal Autonomous Weapons Systems*, UNITED NATIONS OFF. GENEVA, [http://www.unog.ch/80256EE600585943/\(httpPages\)/8FA3C2562A60FF81C1257CE600393DF670penDocument](http://www.unog.ch/80256EE600585943/(httpPages)/8FA3C2562A60FF81C1257CE600393DF670penDocument) (last visited Oct. 26, 2016) [hereinafter *Background*].

42. *See* Rebecca Crootof, *The Killer Robots Are Here: Legal and Policy Implications*, 36

While there are a variety of reasons for this lack of substantive progress, lost in the LAWS debate thus far is the role The Campaign's use of the term "killer robots" plays in both enabling the CCW talks and setting those talks up for stagnation, if not failure.⁴³

On close scrutiny, The Campaign's efforts have been only superficially successful and have come at a self-defeating substantive cost.⁴⁴ Having provoked the international community to envision potential dire harm from killer robots, the called-for ban would include not only future "fully autonomous" weapons systems that don't (and may never) exist, but also unspecified current weapons systems.⁴⁵ The real issue, the real concern, is (or should be) weapons system autonomy in certain critical functions: notably, selecting and engaging targets, or in other words, determining what to fire at and then firing.⁴⁶ But weapons that select and engage targets without further human intervention have long been in use, and with little controversy.⁴⁷

Perhaps recognizing that this circle cannot be squared,⁴⁸ *Losing*

CARDOZO L. REV. 1837, 1837 (2015) (claiming that "no one has yet put forward a coherent definition of autonomy in weapon systems").

43. The debates continue, but for the most part they focus on the substance of a ban and whether LAWS could comply with international humanitarian law—not on the framing of the debate itself. For two such examples, see Michael N. Schmitt, *Autonomous Weapons Systems and International Humanitarian Law: A Reply to the Critics*, HARV. NAT'L. SEC. J. 2 (2013) and Russell Christian, *The 'Killer Robots' Accountability Gap*, HUM. RTS. WATCH (Apr. 8, 2015), <https://www.hrw.org/news/2015/04/08/killer-robots-accountability-gap>.

44. See *infra* Part III.

45. See *infra* notes 104–09 and accompanying text.

46. See *infra* Part III.B. As discussed in this article, even narrowing the discussion to systems that select and engage targets without further human intervention still yields challenges, namely, how to consider the host of weapons that, while fired or launched by a human, perform active and passive functions to select and engage a target. See *infra* Sections III.C, V.A–B.

47. See ICRC REPORT, *supra* note 24, at 11.

48. Referring to the ancient Greek mathematical challenge of constructing a square that has the same area as a circle:

The ancient Greeks had posed various problems, namely to do various constructions with a straight edge and compass, and there were all sorts of constructions they could do, but one of the things they could never figure out how to do was to square the circle. And the realization in modern times, really in the 1800's, was that it's impossible. That no matter what construction you do with a straight edge and compass, no matter how complicated it is, you will never be able to square the circle. You will never be able to find a square with the same area as the circle. So that was somehow a real shift in realizing that it doesn't make sense to keep trying to do this. In fact the answer is, it can't be done.

Can't Square the Circle, MATHEMATICAL SCI. RES. INST., <http://www.msri.org/web/msri/pages/99>

Humanity and the *SR Report* utilize generalized differentiation by purporting that current weapons systems should be included in the ban by using descriptors,⁴⁹ not specifics.⁵⁰ While this partially conceals the paradoxical nature of their overall efforts, it also yields calls for bans that cannot or will not specify what's actually being banned.⁵¹

We should not be surprised that calls for regulation that are incapable of detailing what should be regulated do not set the conditions for a constructive dialogue.⁵² The result of The Campaign's efforts is akin to a car speeding towards and into a cul-de-sac—that the car has reached the cul-

(last visited Oct. 26, 2016). What follows is that “whenever you pose a problem, you have to ask yourself a question, namely, is it, could it be that the answer to what you’re saying, namely, ‘do such and such’ is ‘it can’t be done.’” *Id.* To this author’s thinking, approximating the status quo in the LAWS debate, I contend it is functionally impossible to craft a preemptive ban on speculative future systems that also includes long-existing systems with minimal controversy. *See infra* Part III. Under this view, those seeking a ban—however well intentioned they may be—are like a millennia of mathematicians trying to square the circle: doomed to fail. *See Can’t Square the Circle, supra.* To be clear, that The Campaign’s efforts, in my view, will fail does not mean they shouldn’t seek a ban. But the manner by which they are trying to do so confuses more than clarifies. *See infra* Part III. And whatever credit is due for raising awareness is mitigated, if not eliminated, by the sidewise direction their efforts have caused the substantive debate to take at the CCW. *See infra* Section III.C, Part IV.

49. These descriptors include whether a human is in, on, or out of the weapons-firing decision-making loop, and what the differences are between automated, automatic, and autonomous. *See infra* notes 268–82 and accompanying text. Discussed later in this article, these descriptors oversimplify autonomy and convey a static or fixed status. *See infra* Section III.B. As a result, they are not useful to discretely characterize weapons systems. *See infra* Section II.B.2.b.

50. *See infra* Part III.

51. The Campaign would, and has, disagreed with the claims that there is confusion as to what is meant by LAWS, and that constructive dialogue requires at least a working definition of LAWS. *See Statement by Stephen Goose of Human Rights Watch, CONVENTION ON CERTAIN CONVENTIONAL WEAPONS* (Apr. 12, 2016), [http://www.unog.ch/80256EDD006B8954/\(httpAssets\)/252007F8C3EB3E1EC1257FAE002F4DE5/\\$file/HRW+intervention+Goose+12+April+2016.pdf](http://www.unog.ch/80256EDD006B8954/(httpAssets)/252007F8C3EB3E1EC1257FAE002F4DE5/$file/HRW+intervention+Goose+12+April+2016.pdf) (referring to the claims that “[w]e don’t know what we are talking about” and that “[w]e must have an agreed upon definition before [UN CCW] can proceed any further” as “fallacies”). Yet within minutes of Mr. Goose’s remarks at the 2016 CCW LAWS meeting in which he insisted “there is a common understanding in the room . . . [that w]e are talking about future weapons . . . [that] will be able to select and engage targets on their own,” the ICRC delivered remarks which highlighted that “[s]ome weapon systems in use today can select and attack targets without human intervention.” *Id.*; *Statement of the International Committee of the Red Cross, CONVENTION ON CERTAIN CONVENTIONAL WEAPONS* (Apr. 11, 2016), [http://www.unog.ch/80256EDD006B8954/\(httpAssets\)/9324B81015529E3DC1257F930057AF12/\\$file/2016_LAWS+MX_GeneralExchange_Statements_ICRC.pdf](http://www.unog.ch/80256EDD006B8954/(httpAssets)/9324B81015529E3DC1257F930057AF12/$file/2016_LAWS+MX_GeneralExchange_Statements_ICRC.pdf).

52. *See SR Report, supra* note 3; *Losing Humanity, supra* note 8.

de-sac quickly is meaningless.⁵³ And once there, the options are limited and unproductive: stop, withdraw, or drive in circles. For that to change, the LAWS discussion must move beyond and away from the debate imposed by The Campaign's conceptual framework.⁵⁴ This article seeks to prompt just such a move.⁵⁵ In highlighting the conceptual dissonance that The Campaign has fostered, this article seeks to reframe the debate and proposes a moratorium on a subset of LAWS—those weapons systems primarily designed to lethally target personnel. While seemingly counterintuitive, such a moratorium offers practical and strategic advantages for both The Campaign and the First World States Parties to CCW that already employ LAWS.⁵⁶

Part I explores the challenges in trying to define system autonomy, focusing on prior failed efforts to construct levels and otherwise categorize autonomy.⁵⁷ Part II then applies the concept of autonomy to weapons systems, discussing autonomous and then semi-autonomous weapons and providing examples, including untoward instances in which autonomous weapons killed humans.⁵⁸ Having established a baseline of the challenges inherent in the autonomy discussion, the article then considers the manner by which The Campaign's primary references, *Losing Humanity* and the *SR Report*, utilize moral panic and the conceptual disconnect that follows.⁵⁹ Part IV then explains the manifestation of that disconnect through the lack of progress at CCW.⁶⁰ Part V proposes and explains an alternative to a LAWS ban, following which the article concludes.⁶¹

53. A cul-de-sac is "a street, lane, etc., closed at one end; blind alley; dead-end street" or equally appropriate here, "any situation in which further progress is impossible." *Cul-de-sac*, DICTIONARY.COM, <http://www.dictionary.com/browse/cul-de-sac> (last visited Oct. 26, 2016).

54. See *Who We Are*, *supra* note 5 (emphasizing that The Campaign's conceptual framework polarizes the policy options regarding LAWS into the options of complete prohibition or complete allowance, rather than allowing for a discussion about the breadth of options that countries may have); see also Crotoft, *supra* note 42, at 1837 (asserting that the lack of a current, coherent definition of autonomy leads to the "conflation of legal, ethical, policy, and political arguments").

55. See *infra* Part V.

56. See *infra* Part V.

57. See *infra* Part I.

58. See *infra* Part II.

59. See *infra* Part III.

60. See *infra* Part IV.

61. See *infra* Part V.

I. AUTONOMY

A threshold challenge in discussing LAWS is that there are wildly varied understandings of what is meant by autonomy in general, let alone as applied to weapons systems.⁶² Given autonomy's complex nature, this shouldn't be surprising.⁶³ These different understandings set the conditions for a debate—the substantive inconsistencies of which border on incoherence.⁶⁴ Thus, it would be tremendous progress for the international community if there was a complete and utter *lack* of consensus regarding whether to develop and employ LAWS, but agreement as to what LAWS meant.⁶⁵ But currently, the international community cannot even agree about what they disagree about.⁶⁶

This has been aptly, if unfortunately, demonstrated at the CCW LAWS meetings.⁶⁷ Summarizing technical issues, the chair of a 2014 meeting stated that,

During the whole debate on technical issues of lethal autonomous weapons systems, the notion of autonomy and its definition was at the center of interest. It became quite obvious that there is no ready-made, generally accepted definition of what is an “autonomous system” and as to where to draw the line between “autonomous” and “automatic” or “automated.”⁶⁸

The United Nations Institute for Disarmament Research succinctly explained how the discussion of LAWS

62. See Michael Biontino, *Summary of Technical Issues at CCW Expert Meeting Lethal Autonomous Weapons Systems (LAWS)*, GERMAN PERMANENT MISSIONS GENEVA (May 16, 2014), http://www.genf.diplo.de/Vertretung/genf/en/Archives-en/Aktuell-en-2014/2014-05-16-laws-technical_20issues.html.

63. Thomas, *supra* note 62, at 240–41 (observing that the level of a robot's independence can range anywhere from “automated” to “autonomous,” each with its own, complex definition).

64. See generally Biontino, *supra* note 62 (showing how the varying definitions of the words “automatic,” “automated,” and “autonomous” create a forum with limited agreement between the involved parties); see also Dr. Gregory P. Noone & Dr. Diana C. Noone, *The Debate Over Autonomous Weapons Systems*, 47 CASE W. RES. J. INT'L L. 25, 27–28 (2015) (describing the different ways in which “autonomous” is defined by the International Committee of the Red Cross, the Human Rights Watch, the Department of Defense, and the Navy).

65. See generally Biontino, *supra* note 62.

66. *Id.*

67. *Id.*

68. *Id.*

presently lacks focus, tacking between things (for example, drones, robots and systems), a characteristic (autonomy) and uses (defensive measures? targeting? kill decisions?), in an inconsistent and often confusing way. One of the reasons there are so many different terms being proposed as the object of discussion is that some actors are trying to capture a mix of variables of concern (such as lethality or degrees of human control), while others are talking about more general categories of objects.⁶⁹

The international discussion could draw from the U.S. militaries' unsuccessful efforts in conceptualizing and explaining autonomy.⁷⁰ In 2012, the U.S. Defense Science Board Task Force (DSB) issued a report, "The Role of Autonomy in [Department of Defense (DoD)] Systems," in support of its mandate to "assist the DoD in understanding and preparing to take maximum practical advantage of advances in autonomy."⁷¹ That mandate is reflected in the DSB's executive summary:

Unmanned systems are proving to have a significant impact on warfare worldwide. The true value of these systems is not to provide a direct human replacement, but rather to extend and complement human capability in a number of ways. These systems extend human reach by providing potentially unlimited persistent capabilities without degradation due to fatigue or lack of attention. Unmanned systems offer the warfighter more options and flexibility to access hazardous environments, work at small scales, or react at speeds and scales beyond human capability. With proper design of bounded autonomous capabilities, unmanned systems can also reduce the high cognitive load currently placed on

69. U.N. INST. FOR DISARMAMENT RESEARCH (UNIDIR), FRAMING DISCUSSIONS ON THE WEAPONIZATION OF INCREASINGLY AUTONOMOUS TECHNOLOGIES 3 (2014), <http://www.unidir.org/files/publications/pdfs/framing-discussions-on-the-weaponization-of-increasingly-autonomous-technologies-en-606.pdf> [hereinafter UNIDIR].

70. See *infra* notes 71–84 and accompanying text; see also Noone & Noone, *supra* note 64.

71. DEP'T OF DEF., DEF. SCI. BD., TASK FORCE REPORT: THE ROLE OF AUTONOMY IN DoD SYSTEMS (July 2012), <http://fas.org/irp/agency/dod/dsb/autonomy.pdf> [hereinafter DSB REPORT]. The DSB REPORT is included in this article primarily for its assessment of why DoD's efforts to explain autonomy, well-intentioned though they may have been, were unsuccessful. *Id.* To the extent the article references how the DSB claims autonomy should be viewed, that is offered only as one science board's view to one State's military. *Id.*

operators/supervisors. Moreover, increased autonomy can enable humans to delegate those tasks that are more effectively done by computer, including synchronizing activities between multiple unmanned systems, software agents and warfighters—thus freeing humans to focus on more complex decision making.⁷²

But for DoD to fully leverage (or the international community to constructively discuss) advances in autonomy, a shared and coherent understanding of machine or system autonomy is required.⁷³ DoD had neither.⁷⁴ Instead, the DSB labeled the “pervasive [DoD] effort to define autonomy” as “counter-productive.”⁷⁵

What had been occurring was that different U.S. military services (Army, Navy, and Air Force) were “making significant investments of time and money to develop definitions of autonomy” yet “[t]he competing definitions for autonomy . . . led to confusion.”⁷⁶ And that confusion may have “contribut[ed] to fears of unbounded autonomy.”⁷⁷ The end result was “a waste of both time and money spent debating and reconciling different terms”⁷⁸ that were “irrelevant to the real problems.”⁷⁹

The DoD’s definitional efforts “have been unsatisfactory because they typically try to express autonomy as a widget or discrete component.”⁸⁰ The DSB criticized the U.S. militaries’ attempt to develop “autonomy roadmaps” that were based on trying to correlate levels and types of computer functions needed for a certain level of autonomy.⁸¹ The DSB countered that “[t]hough attractive,” it is neither useful nor helpful to think of the concept of

72. *Id.*

73. *See generally* UNIDIR, *supra* note 69.

74. *Id.*; DSB REPORT, *supra* note 71, at 23.

75. DSB REPORT, *supra* note 71, at 23.

76. *Id.*

77. *Id.* The report acknowledged that “the word ‘autonomy’ often conjures images in the press and the minds of some military leaders of computers making independent decisions and taking uncontrolled action.” *Id.* Noting the concern about fears of “unbounded autonomy” was timely indeed—within four months of the DSB REPORT, *Losing Humanity* was published. *See Losing Humanity*, *supra* note 8.

78. Jeffrey M. Bradshaw, Robert R. Hoffman, Matthew Johnson, and David D. Woods, *The Seven Deadly Myths of Autonomous Systems*, 28 IEEE INTELLIGENT SYSTEMS, no. 3, May–June 2013, at 2, 4, http://www.jeffreymbradshaw.net/publications/IS-28-03-HCC_1.pdf.

79. *Id.*

80. DSB REPORT, *supra* note 70, at 23.

81. *Id.*

autonomy in levels.⁸² This is in part because of the dynamic nature of functions within a system.⁸³ Many functions can be executed “concurrently as well as sequentially . . . and can have a different allocation scheme to the human or computer at a given time.”⁸⁴

Autonomy is better thought of across not one but several spectrums.⁸⁵ And within each spectrum the amount or quality of functions a machine performs often varies and changes as the system operates.⁸⁶ As a result, plotting autonomy as a linear and single axis progressively and discretely demarcated by whether humans are in, on, or out of a functional loop both oversimplifies and misrepresents.⁸⁷ It is just another form of conceptualizing autonomy in levels, which, as discussed, is neither useful nor helpful.⁸⁸

Similarly, attempting to broadly differentiate machine functions as either automatic, automated, or autonomous lacks practical utility.⁸⁹ These terms may be used to understand only one of the spectrums through which we conceptualize autonomy—the complexity of the machine. This spectrum ranges from automatic at the lower end, to automated in the middle, to autonomous at the higher end.⁹⁰ But again this is only one spectrum, the utility of which is limited, because there are no clear boundaries between automatic, automated, or autonomous—a point which CCW States Parties

82. *Id.* at 24.

83. *Id.*; see also Bradshaw et al., *supra* note 78, at 2. Thinking of autonomy in levels is also problematic because “autonomy is relative to the context of activity. Functions can’t be automated effectively in isolation from an understanding of the task, the goals, and the context. . . . [L]evels of autonomy encourage reductive thinking. For example, they facilitate the perspective that activity is sequential when it’s actually simultaneous.” *Id.* at 4 (emphasis omitted) (citing P.J. Feltoovich et al., *Keeping It Too Simple: How the Reductive Tendency Affects Cognitive Engineering*, 19 IEEE INTELLIGENT SYSTEMS, no. 3, May–June 2004, at 90, 90–94).

84. Bradshaw et al., *supra* note 78, at 4.

85. Thomas, *supra* note 62, at 241.

86. Paul Scharre, *Between a Roomba and a Terminator: What is Autonomy?*, WAR ON ROCKS (Feb. 18, 2015), <http://warontherocks.com/2015/02/between-a-roomba-and-a-terminator-what-is-autonomy/>. Three such spectrums are the “nature of the human–machine command and control relationship,” the “complexity of the machine,” and the “type of decision being automated.” *Id.*

87. See *id.*

88. See Biontino, *supra* note 62; see also Scharre, *supra* note 86 (stating that it is “meaningless to refer to a machine as ‘autonomous’ or ‘semiautonomous’ without specifying the task or function being automated”).

89. See Scharre, *supra* note 86.

90. *Id.*

are either learning or relearning.⁹¹

Artificial intelligence researcher Noel Sharkey proposed one way to distinguish the spectrum.⁹² He describes an automatic robot as one that “carries out a pre-programmed sequence of operations or moves in a structured environment. A good example is a robot arm painting a car.”⁹³ In contrast, “[a]n autonomous robot is similar to an automatic machine except that it operates in open or unstructured environments.”⁹⁴

That may seem like a practical depiction by which to discern whether a machine is automatic or autonomous—and The Campaign’s primary sources reference it as such.⁹⁵ But without including what is meant by open and unstructured, it is another example of trying to define a difficult concept using terms that are either ambiguous or themselves open to debate.⁹⁶ The lack of functional utility becomes readily apparent in trying to apply the depiction beyond car-painting robot arms.

Consider the following assessment of a household cleaning device, the Roomba robotic vacuum cleaner:

The Roomba must navigate a house full of obstacles while ensuring that the carpet is cleaned. . . . The Roomba user provides high-level goals (vacuum the floor, but don’t vacuum here, vacuum at this time of day, etc.). The Roomba must make some choices itself (how to identify the room geometry, avoid obstacles, when to recharge its battery, etc). The Roomba also has some automated behavior and encounters situations it cannot resolve on its own (e.g., it gets stuck, it can’t clean its own brushes, etc.). Overall, the Roomba has marginal autonomy, and there are numerous situations it cannot deal with by itself. It is certainly not intelligent. However, it does have basic on-board diagnostic capability (“clean my brushes!”) and a strategy . . . for vacuuming a room about whose size and layout it

91. *Id.*; see generally Biontino, *supra* note 62 (emphasizing the lack of understanding in the current discussion about the role of autonomy related to LAWS).

92. See Neil Sharkey, *Automating Warfare: Lessons Learned from the Drones*, 21 J.L. INF. & SCI. 140, 141 (2011).

93. *Id.*

94. *Id.*

95. See *Losing Humanity*, *supra* note 8, at 12; *SR Report*, *supra* note 3, ¶ 42.

96. See *supra* Section III.A.2; see also *SR Report*, *supra* note 3, ¶ 42.

was initially ignorant.⁹⁷

Where should the Roomba be placed within the human-machine spectrum? Is the Roomba automatic? Automated? Autonomous?⁹⁸ Similarly, where in the loop should a household thermostat or microwave oven be placed? The answer—which further illustrates that we cannot draw system-wide conclusions from this spectrum—is that we don’t know without more information about the system.⁹⁹ Certain thermostats and microwave ovens would likely be considered automated, while others, capable of sensing and adjusting their operation, are more likely autonomous.¹⁰⁰ But again, the lines are fuzzy and machine complexity is just one spectrum.¹⁰¹

According to the DSB, DoD’s focus instead should be on achieving “a capability through the best combination of human and machine abilities” with a goal of “creating a joint human–machine cognitive system.”¹⁰²

In other words, autonomy isn’t a discrete property of a work system, nor is it a particular kind of technology; it’s an idealized characterization of observed or anticipated interactions between the machine, the work to be accomplished, and the situation. To the degree that autonomy is actually realized in practice, it’s through

97. See Chad R. Frost, *Challenges and Opportunities for Autonomous Systems in Space*, in FRONTIERS OF ENGINEERING: REPORTS ON LEADING-EDGE ENGINEERING FROM THE 2010 SYMPOSIUM 89, 90 (2011).

98. Similarly, consider driving a car—its features and functions are activated by the human driver versus the car itself. See Scharre & Horowitz, *supra* note 25, at 5 (“Most cars today include anti-lock brakes, traction and stability control, power steering, emergency seat belt retractors and air bags. Higher-end cars may include intelligent cruise control, automatic lane keeping, collision avoidance and automatic parking.”).

99. See *infra* note 100; see also Scharre, *supra* note 86.

100. Noted philosopher of technology Peter Asaro distinguishes automated from autonomous on the grounds that unsupervised automated systems “involve repetitive, structured, routine operations without much feedback information (such as a dishwasher),” while autonomous systems operate in “dynamic, unstructured, open environments based on feedback information from a variety of sensors (such as a self driving car).” Peter Asaro, *On Banning Autonomous Weapon Systems: Human Rights, Automation, and the Dehumanization of Lethal Decision Making*, 94 INT’L REV. RED CROSS, no. 866, 2012, at 690 n.5. This approach is useful to the same extent as Professor Sharkey’s. See Sharkey, *supra* note 92. Assuming one can apply the approach to weapons systems, it’s unclear how extant LAWS are more comparable to the dishwasher than the self-driving car, let alone why the focus is on overall categorization and not critical functions such as engagement. See, e.g., Scharre & Horowitz, *supra* note 25.

101. See Scharre & Horowitz, *supra* note 25, at 5.

102. DSB REPORT, *supra* note 71, at 23.

the combination of these interactions.¹⁰³

The DSB proposed a “dynamic view of human machine interaction” that broadly refers to autonomy as “a *capability* of the larger system enabled by the integration of human and machine abilities.”¹⁰⁴ This approach recognizes that the operation of all machines requires some degree of human involvement.¹⁰⁵ This means that “*there exist no fully autonomous systems*, just as there are no fully autonomous soldiers, sailors, airmen or Marines.”¹⁰⁶ The point that autonomy is limited extends to weapons systems as well—there is no such thing as a fully autonomous weapon.¹⁰⁷

As one commentator observed, “the question of when we will get to ‘full autonomy’ is meaningless. There is not a single spectrum along which autonomy moves. . . . [A] better framework would be to ask what tasks are done by a person and which by a machine.”¹⁰⁸ Exploring how DoD is attempting to parse out that task allocation within the context of weapons systems is by no means dispositive of the “right answer.” But those efforts provide a useful frame of reference by which to discuss specific weapons systems, *Losing Humanity*, and the *SR Report*.¹⁰⁹

II. LAWS

In 2012, DoD issued a directive on “Autonomy in Weapon Systems based on prior DSB work.”¹¹⁰ The directive “[e]stablishes DoD policy and assigns responsibilities for the development and use of autonomous and

103. Bradshaw et al., *supra* note 78. Another way to think of autonomous machines is in terms of the extent of self-directedness and self-sufficiency. *Id.*

104. DSB REPORT, *supra* note 71, at 23–24.

105. *See id.*

106. *Id.* (emphasis added).

107. As the President of the ICRC observed in 2011 (referring to “truly” as opposed to “fully” autonomous weapons), “such systems have not yet been weaponised. Their development represents a monumental programming challenge that may well prove impossible.” Jakob Kellenberger, President, Int’l Comm. of the Red Cross, Keynote Address at the 34th Round Table of Current Issues of International Humanitarian Law (Sept. 8, 2011) (transcript available at <https://www.icrc.org/eng/resources/documents/statement/new-weapon-technologies-statement-2011-09-08.htm>).

108. *See* Scharre, *supra* note 86.

109. *See infra* Section III.A.

110. DEP’T OF DEF. DIRECTIVE 3000.9, AUTONOMY IN WEAPON SYSTEMS (2012), <http://www.dtic.mil/whs/directives/corres/pdf/300009p.pdf> [hereinafter DOD DIRECTIVE].

semi-autonomous functions in weapon systems, including manned and unmanned platforms.”¹¹¹

That the policy on autonomous weapons systems applies to manned as well as unmanned platforms reflects the concept of autonomy as the capability of a system that integrates human and machine abilities.¹¹² It also reinforces the idea that autonomy is better thought of across several spectrums.¹¹³

As discussed above, asking whether a system is autonomous shouldn’t yield an answer but rather a series of questions, including clarification of what functions within the system the questions refer to.¹¹⁴ In the context of weapons systems, the functions generating the most concern are the selecting and engaging of targets. Whether and how a weapons system performs those functions without further human input is at the core of the debate.¹¹⁵

The DoD policy defines an autonomous weapons system as:

A weapon system that, once activated, can select and engage targets without further intervention by a human operator. This includes human-supervised autonomous weapon systems that are designed to allow human operators to override operation of the weapon system, but can select and engage targets without further human input after activation.¹¹⁶

111. *Id.* at 1.

112. *See* Bradshaw et al., *supra* note 78; DSB REPORT, *supra* note 71.

113. *See* Scharre, *supra* note 86.

114. *See supra* notes 108–09 and accompanying text.

115. *See* Schmitt, *supra* note 43; DoD Directive, *supra* note 110, at 1.

116. DOD DIRECTIVE, *supra* note 110, at 13–14. The DoD Directive requires parsing and may be seen by some as either disingenuous or inconsistent, at least in part. *Id.* While not clearly stated, the policy allows at least certain types of LAWS to kill people. *See id.* at 3. “Autonomous weapons may be used to apply non-lethal, non-kinetic force,” while at the same time the definition includes human-supervised autonomous weapons. *Id.* Human-supervised autonomous weapons systems may be used to “select and engage targets” with lethal force, without engaging humans as targets. *Id.* But human-supervised autonomous systems may employ lethal force in defense of manned installations and platforms. *Id.* While some attacks may involve only munitions-firing mortars or rockets for example, others involve manned planes, boats, and vehicles. *Id.* Ultimately, the policy allows for the use of human-supervised LAWS against such manned systems, just requiring that the system, the plane, the boat, or the vehicle, be the specific target, not the human crew/occupants. *See id.* Often, the end result for the human crew and occupants will be the same whether a LAWS targets them specifically or the system in which they are operating. *See id.*

Of note, this definition makes no reference to or distinction based on automated, automatic, and autonomous weapons systems.¹¹⁷ The definition simply flows from weapons systems that can select and engage targets without further human input.¹¹⁸ While this may seem straight-forward, when later dealing with *Losing Humanity* and the *SR Report*, it becomes anything but.¹¹⁹

Under the DoD Policy, the human override in the event of a weapons systems' malfunction would need to occur "before unacceptable levels of damage occur."¹²⁰ This implicitly recognizes both that "damage" will occur and that some level of untoward harm, while not desirable, is acceptable.¹²¹ Indeed, the LAWS conversation must acknowledge that weapons systems capable of selecting and engaging targets without further human intervention have existed for decades, as well as the unfortunate fact that they have already taken human life.¹²²

A. *Autonomous Weapons System Examples*

In a report following a 2014 expert meeting, the International Committee of the Red Cross provided a sampling of existing weapons systems, "for which critical functions (i.e. acquiring, tracking, selecting and attacking targets) are autonomous."¹²³ The examples include:

- "Patriot surface-to-air missile system; a missile defence system that automatically detects, and tracks targets before firing interceptor missiles",¹²⁴
- "Aegis Weapon System; a ship-based system combining

117. *See id.*

118. *See id.*

119. *See infra* Section III.B.

120. DOD DIRECTIVE, *supra* note 110, at 14.

121. *See id.*

122. *See generally* Kim R. Holmes, *Drones, Robots and the Human Factor in War*, WASH. TIMES (Apr. 27, 2015), <http://www.washingtontimes.com/news/2015/apr/27/kim-holmes-lethal-autonomous-weapon-system-ban-no-/>; *see also infra* Section II.A.

123. ICRC Report, *supra* note 24, at 65 n.40.

124. *Id.* (citing *Global Patriot Solutions*, RAYTHEON <http://www.raytheon.com/capabilities/products/patriot/> (last visited Oct. 26, 2016). First employed in the late 1970s, the Patriot is utilized by the United States and twelve other countries. *Id.*

radar to automatically detect and track targets with various missile and gun systems”;¹²⁵

- “Phalanx Close-in Weapon System; a ship-based 20 mm gun system that autonomously detects, tracks and attacks targets”;¹²⁶
- “Goalkeeper Close-in Weapon System,¹²⁷ an autonomous and completely automatic weapon system for short-range defence of ships against highly maneuverable missiles, aircraft and fast maneuvering surface vessels”;¹²⁸
- “Counter Rocket, Artillery, and Mortar System; a land-based fixed weapon system that employs the same technology as the Phalanx Close-in Weapon System to target and attack rockets, artillery and mortars”;¹²⁹
- “Iron Dome; a ground based air defence system which

125. *Id.* (citing *Aegis Weapon System*, AM.’S NAVY, http://www.navy.mil/navydata/fact_display.asp?cid=2100&tid=200&ct=2 (last updated Jan. 5, 2016)). First employed in 1978, Aegis is utilized by the US and four other countries. *Id.*

126. *Id.* (citing *MK 15—Phalanx Close-in Weapons System (CIWS)*, AM.’S NAVY, http://www.navy.mil/navydata/fact_print.asp?cid=2100&tid=487&ct=2&page=1 (last updated May 9, 2016); *SeaRAM Close-In Weapon System (CIWS) Anti-Ship Missile Defense System*, AM.’S NAVY, http://www.navy.mil/navydata/fact_display.asp?cid=2100&tid=456&ct=2 (last updated May 10, 2016)). Used since 1980, the Phalanx is installed on all U.S. Navy surface combatant ship classes and on those of twenty-four allied nations. *Phalanx Close-in Weapon System*, RAYTHEON, <http://www.raytheon.com/capabilities/products/phalanx/> (last visited Oct. 26, 2016) [hereinafter *Phalanx*]. Other countries have developed or employ CIWS variants. See Scharre & Horowitz, *supra* note 25 (describing the Russian made Kashtan CIWS used by China and India), Kelvin Fong, *CIWS: The Last-Ditch Defence*, ASIAN DEF. J. (July–Aug. 2008), 18–20, http://gallery.military.ir/albums/userpics/CIWS_article.pdf (discussing CIWS made or used by Denmark, Germany, Israel, Russia, and South Korea); *Defensa Antimisil Meroka (CIWS—Close in Weapon System)*, FOLOR MILITAR GENERAL, <http://www.militar.org.ua/militar/artilleria/artilleria-naval-meroka-ciws.html> (last visited Nov. 28, 2016) (describing the Meroka Missile Defense, a Spanish CIWS).

127. ICRC Report, *supra* note 24, at 65 n.40. “Goalkeeper is operational in the navies of Belgium, Chile, the Netherlands, Portugal, Qatar, South Korea, the UAE and the UK.” *Goalkeeper—Close-in Weapon System*, THALES, <https://www.thalesgroup.com/en/netherlands/defence/goalkeeper-close-weapon-system> (last visited Oct. 26, 2016) [hereinafter THALES].

128. THALES, *supra* note 127.

129. ICRC Report, *supra* note 17, at 65 n.40.

automatically selects targets and fires interceptor missiles”;¹³⁰

- “NBC MANTIS (Modular, Automatic and Network-capable Targeting and Interception System); an automated ground based air defence system using 35 mm guns to automatically target rocket, artillery and mortars.”¹³¹

The majority of those weapons systems are not new; they have been used for decades to varying degrees.¹³² As a result, it’s challenging to assemble a coherent contemporary argument as to why 1980s weapons systems employed with minimal issues are now problematic.¹³³ Perhaps focusing on the looming prospect of fully autonomous weapons is easier, superficially anyway, than trying to articulate a retrospective argument.¹³⁴

But what is it about autonomy—beyond machines selecting and engaging targets without human intervention—that is worrisome? Because full autonomy, if even possible, would be unbounded, depicting it in two dimensions is challenging. Consider full autonomy as the oval below, comprised of any number of functions (presumably infinite) depicted as the smaller sub ovals.¹³⁵

130. *Id.* (citing *Iron Dome*, RAFAEL ADVANCED DEF. SYSTEMS LTD., <http://www.rafael.co.il/Marketing/186-1530-en/Marketing.aspx> (last visited Oct. 26, 2010)).

131. *Id.*; see also *World Premiers at Eurosatory 2016*, RHEINMETALL DEF. (June 13, 2016), http://www.rheinmetall-defence.com/en/rheinmetall_defence/public_relations/news/latest_news/aktuellesdetailansicht_1_10496.php.

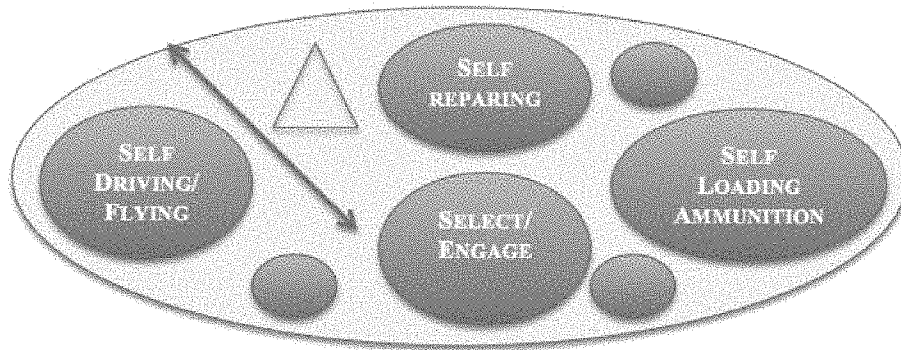
132. See *supra* notes 123–31 and accompanying text.

133. Cf. Mark Gubrud, *Why Should We Ban Autonomous Weapons? To Survive*, IEEE SPECTRUM (June 1, 2016), <http://spectrum.ieee.org/autamaton/robotics/military-robots/why-should-we-ban-autonomous-weapons-to-survive> (asserting that opposition to lethal autonomous weapons has been present for decades, but thus far has not prevented the proliferation of such machines and systems).

134. See *Autonomous Weapon Systems: Is It Morally Acceptable for a Machine to Make Life and Death Decisions?*, INT’L COMMITTEE RED CROSS (Apr. 13, 2015), <https://www.icrc.org/en/document/lethal-autonomous-weapons-systems-LAWS> (urging countries to consider the ethical and legal issues raised by autonomous weapons).

135. See *infra* Figure 1.

Figure 1. 'FULL AUTONOMY'



There is space, an autonomy “delta” (Δ), between full autonomy and autonomy in the function of selecting and engaging targets.¹³⁶ Among other functions, this delta could be manifested by logistics trucks¹³⁷ or aircrafts,¹³⁸ for example, capable of recharging or reloading themselves or performing internal diagnostic assessments and repairs.

To ground the LAWS debate in full autonomy requires articulating what is concerning about weapons systems *beyond* the capability to select and engage targets without human intervention.¹³⁹

Consider a hypothetical weapons system “A,” which performs all manner of functions autonomously *except* the selection and engagement of targets.¹⁴⁰

136. See *supra* Figure 1.

137. See Lance M. Bacon, *Unmanned Vehicles Heading for Battlefield*, ARMY TIMES, Sept. 2, 2013, at 13 (describing the U.S. Army’s plans for driverless trucks).

138. See Joe Gould, *Army Seeks to Cut Casualties with Unmanned Delivery Craft*, ARMY TIMES, Dec. 8, 2014, at 22; Aaron Mehta, *Sikorsky Plans First Flight of Autonomous Black Hawk*, ARMY TIMES, May 14, 2014 (describing the U.S. Army’s plans for unmanned aerial delivery systems, which would not be remotely piloted, but would autonomously perform flight functions).

139. See *supra* Part I (discussing the difficulty of defining autonomy, thereby requiring clarity over concerns other than selecting and engaging targets without human intervention). Otherwise the argument could (and this article contends it should) focus on weapons systems capable of selecting and engaging targets without further human intervention. See *infra* Part V. But this would require acknowledging that the LAWS discussion involves extant and future systems, which The Campaign is not able to concede and maintain positional coherence. See *infra* Section III.A.1 (discussing The Campaign’s failure to acknowledge extant autonomous weapons systems).

140. See *infra* Figure 2.

Figure 2. Hypothetical Weapons System A



Hypothetical Weapon System A

- **Self Driving**
- **Self Fueling**
- **Self Repairing**
- **Self Loading of ammunition**
- **Human selects and engages targets**

Now consider the inverse of A, hypothetical system “B,” in which humans perform virtually all the functions, but B, not a human operator, selects and engages targets.¹⁴¹

Figure 3. Hypothetical Weapons System B



Hypothetical Weapons System B

- **Human Drives**
- **Human Fuels**
- **Human Repairs**
- **Human loads ammunition**
- **Weapons system selects and engages targets**

Which of the functions that the different weapons systems perform are concerning and by what criteria? As this paper advocates, the LAWS discussion should focus on the critical functions of selecting and engaging targets.¹⁴² The conversation about the dangers of full autonomy, apart from (or in addition to) machines able to select and engage targets without human

141. See *infra* Figure 3.

142. See *infra* Part V (proposing a moratorium on LAWS primarily designed to lethally target personnel).

intervention, tends to drift between science—including artificial intelligence¹⁴³ and the concept of singularity¹⁴⁴—and science fiction—

143. John McCarthy, the professor who developed the term artificial intelligence (AI) in 1956, defined it as “science and engineering of making intelligent machines, especially intelligent computer programs.” Paulo Leitao, *Multi-agent Systems in Industry: Current Trends & Future Challenges*, in BEYOND ARTIFICIAL INTELLIGENCE 197, 198 (Kelemen, Romportl, Zackova ed., 2013); see also NICK BOSTROM, *SUPERINTELLIGENCE: PATHS, DANGERS, STRATEGIES* (2014). But AI means different things to different researchers. ELA KUMAR, *ARTIFICIAL INTELLIGENCE 2* (2008). On the one hand, humans have of course already made any number of intelligent machines, so one could say AI was reached some time ago. *Id.* at 3–4. But thought of in terms of superintelligence and a machine having the ability to improve itself, estimates range from decades from now to a few thousand years, and presumably any number in between. See Luke Muelhauser, *When Will AI Be Created?*, MACHINE INTELLIGENCE RES. INST. (May 15, 2013), <https://intelligence.org/2013/05/15/when-will-ai-be-created/>.

144. While it’s unclear whether full autonomy could ever exist, some claim that the possibility could or would change once “technological singularity” is reached. See Joseph Savirimuthu, *Singularity and the Art of Warfighters: The Geneva Convention on Trial*, in *SUPER SOLDIERS: THE ETHICAL, LEGAL, AND SOCIAL IMPLICATIONS* 167, 168–69 (Jai Galliot & Mianna Lotz eds., 2016). And of course like every other term or concept in this discussion, technological singularity means very different things to different people, as one article that provides seventeen different definitions illustrates. Nikola Danaylov, *17 Definitions of the Technological Singularity*, INST. FOR ETHICS & EMERGING TECH., (Aug. 22, 2012), <http://ieet.org/index.php/IEET/more/danaylov20120822>. Those outside the computer science field (including this author) tend to forget that the human brain far outpaces any computer in the world in terms of processing power. Jeremy Hsu, *Estimate: Human Brain 30 Times Faster than Best Supercomputers*, IEEE SPECTRUM (Aug. 25, 2016), <http://spectrum.ieee.org/tech-talk/computing/networks/estimate-human-brain-30-times-faster-than-best-supercomputers>. IBM is attempting to “simulate the human brain” through the use a super computer. Mark Fischetti, *IBM Stimulates 4.5 Percent of the Human Brain, and All of the Cat Brain*, SCI. AM. (Oct. 25, 2011), <http://www.scientificamerican.com/article/graphic-science-ibm-simulates-4-percent-human-brain-all-of-cat-brain/>. “To rival the cortex inside your head, IBM predicts it will need to hook up 880,000 processors, which it hopes to achieve by 2019.” *Id.* <http://www.scientificamerican.com/article/graphic-science-ibm-simulates-4-percent-human-brain-all-of-cat-brain/>. It is this point and this definition of singularity—machines having more processing power than humans—that for some heralds the end of days. See, e.g., Danaylov, *supra*. In 1993, math and computer science professor Vernor Vinge (who popularized the concept of technological singularity) claimed that “[w]ithin thirty years, we will have the technological means to create superhuman intelligence. Shortly after, the human era will be ended.” Vernor Vinge, *The Coming Technological Singularity: How to Survive in the Post-Human Era*, in NASA CONF. PUBLICATION 10129, VISION 21 INTERDISCIPLINARY SCIENCE AND ENGINEERING IN THE ERA OF HYPERSPACE 11, 11 (1993), <https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/19940022855.pdf>. Professor Vinge, a mathematics professor, computer scientist, and author, is an interesting example of one whose works blur the line between science and science fiction. See *Who’s Afraid of First Movers*, SINGULARITY SUMMIT (2012), <http://mindstalk.net/vinge/firstMoversTalk.html>. While Vinge’s time estimate for singularity is roughly 2023, Google’s engineering director estimates 2045. See Tanya Lewis, *The Singularity is Near: Mind Uploading by 2045?*, LIVESCIENCE (June 17, 2013 5:29 PM), <http://www.livescience.com/37499-immortality-by-2045-conference.html>; cf. Erik Sofge, *The End Is A.I.: The Singularity is Sci-Fi’s Faith-Based Initiative*, POPULAR SCI. (May 28, 2014),

including robots somehow countermanding human-imposed operating constraints.¹⁴⁵

We don't know what full autonomy means, if it's even reachable, or if so, when.¹⁴⁶ This is a challenging foundation upon which to build a call for a ban.¹⁴⁷ And it overlooks what we do know: that LAWS have existed for some time, and there have been untoward outcomes in which LAWS have killed humans.¹⁴⁸

B. *Untoward Outcomes*

Just as the conversation on LAWS must include that systems have been in use, some for decades, it must also include that there have been untoward outcomes. Some incidents were the result of weapon systems that fired or launched without the direction of a human.¹⁴⁹ Despite not resulting in any casualties, on February 26, 1991, during an armed conflict with Iraq, on U.S. warship's Phalanx system,¹⁵⁰ while in an autonomous mode, fired several rounds into another U.S. warship while attempting to down an Iraqi anti-ship missile.¹⁵¹ In separate incidents during the 2003 invasion of Iraq, U.S. Patriot systems,¹⁵² operating in an autonomous mode, misidentified friendly aircraft as enemy, leading to the downing of a US F-18¹⁵³ and a British

<http://www.popsoci.com/blog-network/zero-moment/end-ai-singularity-sci-fis-faith-based-initiative> ("Vinge believed [the singularity] would appear by 2023, or 2030 at the absolute latest.").

145. This of course includes Isaac Asimov's classic *I, Robot* short story series, which developed the three science fiction laws of robotics and a host of creative works that followed. See ISAAC ASIMOV, *I, ROBOT* (1950); see also Raymond August, *Corpus Juris Roboticum*, 8 COMPUTER L.J. 375, 381 (1988) (discussing Asimov's three laws of robotics). These include the *Terminator* movie series, in which Skynet, a computer run defense network, becomes self-aware and attempts to wipe out the human race. See *TERMINATOR* (Hamdale Film Corp. 1984).

146. See *supra* Part I (discussing the difficulty of defining autonomy).

147. See *infra* Part V.

148. See *infra* Section II.B; THALES, *supra* note 127.

149. See *id.* Humans do control these systems, but that control functionally means the ability to turn off a system *after* an untoward engagement, not the ability to *prevent* the engagement from occurring. *Id.* at 33.

150. ICRC REPORT, *supra* note 24, at 65.

151. BERNARD ROSTKER, DEP'T OF DEF., ENVIRONMENTAL EXPOSURE REPORT: DEPLETED URANIUM IN THE GULF (II), http://www.gulflink.osd.mil/du_ii/du_ii_tabh.htm (last updated Dec. 13, 2000).

152. ICRC REPORT, *supra* note 24, at 72.

153. Neil Tweedie, *US Fighter Shot Down by Patriot Missile*, TELEGRAPH (Apr. 4, 2003), <http://www.telegraph.co.uk/news/worldnews/middleeast/iraq/1426631/US-fighter-shot-down-by-Pat>

Tornado,¹⁵⁴ killing the crews of both.¹⁵⁵ And, in 2007 a South African automatic cannon malfunctioned during a demonstration, killing nine soldiers and wounding fourteen others.¹⁵⁶

Refusing to acknowledge the existence of LAWS, and that while there have been untoward outcomes, there haven't been many, is a form of avoidance enabled by the red herring of future, fully autonomous killer robots.¹⁵⁷ This is not only problematic in and of itself but also in terms of advancing the discussion. Moreover, the inability or refusal to acknowledge extant systems capable of selecting and engaging targets without human intervention makes it that much more difficult to consider the sizeable "grey area" of semi-autonomous weapons.¹⁵⁸

C. Semi-Autonomous Weapons

As has been discussed, the definition of autonomous weapons is predicated on systems that select and engage targets without human intervention; engage meaning to fire or to launch.¹⁵⁹ Thus, where a human being pushes the proverbial red button or squeezes a trigger, the weapons system is not autonomous,¹⁶⁰ but where the weapons system initiates launching or firing, it is autonomous, at least in regard to the function of

riot-missile.html (describing the incident by which a U.S. Army Patriot missile system shot down a U.S. F-18 warplane, killing the pilot, U.S. Navy Lieutenant Nathan White).

154. *RAF Tornado Downed by US Missile*, BBC NEWS (Mar. 23, 2003), http://news.bbc.co.uk/2/hi/uk_news/2877349.stm (describing the incident by which a U.S. Army Patriot missile system shot down a Royal Air Force Tornado, killing the two crew members, Flight Lieutenants Kevin Main and David Williams).

155. See Tweedie, *supra* note 153.

156. Noah Schactman, *Robot Cannon Kills 9, Wounds 14*, WIRED (Oct. 18, 2007), <http://www.wired.com/2007/10/robot-cannon-ki/> (describing the cannon as automatic, because it "pick[ed] out targets" but a human needed to pull the trigger). While that may have been the intended design, for whatever reason the cannon was able to fire five-hundred 35 mm cannon shells. *Id.* Humans made heroic but unsuccessful attempts to stop the cannon, but ultimately it stopped firing because it exhausted its ammunition supply. *Id.*

157. See *supra* Section II.A; see, e.g., Angela Kane, *Killer Robots and the Rule of Law*, WORLDPOST (Sept. 14, 2013), http://www.huffingtonpost.com/A-View-from-the-United-Nations-/killer-robots-and-the-rul_b_3599657.html ("Some argue that since autonomous weapons have not been deployed, it is premature to take action.").

158. See *supra* note 139 and accompanying text.

159. See *supra* note 116 and accompanying text; see also John Lesix, Comment, *The Case for Regulating Fully Autonomous Weapons*, 124 YALE L. J. 1309, 1310–11 (2015).

160. See Lesix, *supra* note 159, at 1311.

engagement.¹⁶¹

The question then becomes what to make of systems where a human engages, but the weapons system refines or even changes the target while in flight? Under the DoD policy these are semi-autonomous weapons systems, defined as:

A weapon system that, once activated, is intended to only engage individual targets or specific target groups that have been selected by a human operator. This includes:

Semi-autonomous weapon systems that employ autonomy for engagement-related functions including, but not limited to, acquiring, tracking, and identifying potential targets; cueing potential targets to human operators; prioritizing selected targets; timing of when to fire; or providing terminal guidance to home in on selected targets, provided that human control is retained over the decision to select individual targets and specific target groups for engagement.¹⁶²

A number of types of systems fall under this definition.¹⁶³ Among the least problematic are systems like the Boomerang acoustic gunshot detector.¹⁶⁴ During an armed conflict knowing the origin of direct fire, such as a sniper shooting at an army patrol, is, obviously, critically important to that patrol. Yet quite often in armed conflict it can be quite clear that one or more combatants are shooting, but it is often unclear where exactly they are located. This problem is even more pronounced in an urban environment where sounds, including those from gunfire, reverberate. Against this backdrop is the Boomerang system, which uses acoustic sensors to identify the origins of even a single gunshot.¹⁶⁵ There are several versions of the

161. See generally Scharre & Horowitz, *supra* note 25 (discussing certain differences between autonomous and semi-autonomous weapons systems).

162. DOD DIRECTIVE, *supra* note 110.

163. See Gui Marie Del Prado, *These Weapons Can Find a Target All by Themselves—And Researchers Are Terrified*, TECH INSIDER (July 30, 2015), <http://www.techinsider.io/which-artificially-intelligent-semi-autonomous-weapons-exist-2015-7>.

164. See *Boomerang III*, RAYTHEON, <http://www.raytheon.com/capabilities/products/boomerang/> (last visited Oct. 27, 2016).

165. See *id.* When a shot is detected, Boomerang immediately announces it; for example: “[S]hot. two o’clock. 400 meters.” *Id.*; see also Spc. Samuel Soza, *Shooter-Detection ‘Boomerangs’*

Boomerang for use on vehicles, at guard towers, and even on individual soldiers.¹⁶⁶ In one of the vehicle variants, the Boomerang may be connected to a weapons system, such as a machine gun.¹⁶⁷ The Boomerang identifies the source of the sniper fire in less than a second, and the machine gun is automatically traversed and adjusted to aim at the point of acoustic origin.¹⁶⁸ There, the machine contributions to this integrated system stop, and the human involvement functionally begins.¹⁶⁹ It is a soldier who verifies that the machine gun is in fact pointed at the sniper.¹⁷⁰ The soldier can observe what is (or isn't) near the sniper and make the decision whether to fire the machine gun.¹⁷¹ Thus the Boomerang is an example of a semi-autonomous weapons system.¹⁷² The Boomerang does not engage targets, the human does.¹⁷³ But the Boomerang employs autonomy to acquire and identify potential targets that are cued to a human operator.¹⁷⁴

Also included in the definition of semi-autonomous weapons and illustrating the delineation challenges are fire-and-forget or lock-on-after-launch homing missiles.¹⁷⁵ These are munitions, such as missiles, that can

Helping in Iraq, U.S. ARMY (Dec. 17, 2009), <http://www.army.mil/article/32029/>.

166. See *Boomerang III*, *supra* note 164; see also *Boomerang Warrior-X*, RAYTHEON, http://www.raytheon.com/capabilities/products/boomerang_warriorx/ (last visited Oct. 11, 2016).

167. See generally *Boomerang III*, *supra* note 164 (explaining that the “Boomerang is easily integrated with options such as the Boomerang Situation Awareness System and third-party systems”).

168. See *id.*; Mike Hanlon, *Vehicle-Mounted Acoustic Sniper Detection System*, NEW ATLAS (Aug. 27, 2005), <http://newatlas.com/go/4497/>.

169. Cf. Hanlon, *supra* note 168 (describing how once the Boomerang detects the enemy shooter's position, “[t]he system resets for subsequent shot detection”).

170. See generally Paul Scharre, *Autonomous Weapons and Operational Risk*, CTR. FOR NEW AM. SECURITY 5 (Feb. 2016), https://www.files.ethz.ch/isn/196288/CNAS_Autonomous-weapons-operational-risk.pdf [hereinafter *Operational Risk*] (explaining that semi-autonomous weapons require “a human in the loop to authorize each engagement”).

171. See *id.*; *Boomerang III*, *supra* note 164.

172. See *Boomerang III*, *supra* note 164.

173. See *id.*

174. See *id.* Similarly, consider advances in fire control technology that “turn[] an average shooter into a deadly sniper in a matter of minutes.” See Bacon, *supra* note 137, at 13. A computer processor attached to a rifle calculates offset and lead and generates an aiming dot on which the soldier orients the weapon and fires. *Id.* While this technology is currently being used by and for snipers—a small group of specialized military members—the goal is to incorporate the technology into the weapons used by regular soldiers. *Id.* The results, at least with the snipers, have been a significant increase in accuracy, which should aid in lessening collateral harm to civilians. *Id.*

175. See *supra* notes 162–63 and accompanying text.

be used on the ground,¹⁷⁶ in the air,¹⁷⁷ or in water.¹⁷⁸ A human operator fires or launches the missile at an intended target or in the general direction of several potential targets.¹⁷⁹ Once fired, a panoply of different guidance systems initiate and they, not the human operator,¹⁸⁰ adjust the missile's path in flight.¹⁸¹ In the air, that can mean missile flight times of over thirty seconds.¹⁸² At sea, ships and submarines fire torpedoes that run for minutes.¹⁸³ And during this flight or run time, the missile or torpedo, through its guidance mechanisms, selects, refines, prioritizes and then engages the target.¹⁸⁴

Semi-autonomous systems, or whatever we choose to call them, represent the fault lines in the LAWS discussion and pose some of the hardest challenges in terms of definitions and where and how to potentially

176. *Javelin Weapon System: Man-Portable Guided Weapon System*, RAYTHEON, <http://www.raytheon.com/capabilities/products/javelin/> (last visited Oct. 11, 2016).

177. *AMRAAM: Modern, Versatile and Proven*, RAYTHEON, <http://www.raytheon.com/capabilities/products/amraam/> (last visited Oct. 11, 2016).

178. *See AGM/RGM/UGM-84 Harpoon Missile*, BOEING, <http://www.boeing.com/history/products/agm-84d-harpoon-missile.page> (last visited Oct. 11, 2016).

179. *See supra* notes 176–78 and accompanying text.

180. Contrast, for example, a TOW missile, which is a fly-by-wire, anti-tank missile used by Armies. *See TOW Weapon System*, RAYTHEON, http://www.raytheon.com/capabilities/products/tow_family/ (last visited Oct. 11, 2016). An individual soldier operating on the ground or from inside a vehicle or helicopter fires a TOW missile, and the soldier then corrects the missile's trajectory in flight through adjustments which are relayed from the firing platform to the in-flight missile via radio frequency. *Id.*

181. *See id.* The guidance systems may include, among other capabilities, internal navigation, passive, active, and altimeter radars, and the use of infrared imaging. *See id.*

182. *See, e.g., Brimstone Advanced Anti-Armour Missile, United Kingdom*, ARMY TECH., <http://www.army-technology.com/projects/brimstone/> (last visited Oct. 11, 2016). For example, during that thirty-second period, the sensors of the United Kingdom's missile, Brimstone, identify where the target's optimal impact point is. *Id.*

183. *See generally Operational Risk, supra* note 170; *Submarine Periscopes and Approach Techniques*, FLEET SUBMARINE, <http://www.fleetsubmarine.com/periscope.html> (last visited Oct. 11, 2016).

184. What if after the plane, ship, or submarine fires this type of munition, the firing platform is destroyed or communications between the platform and the munition are lost? The DoD Policy suggests that this would transform a semi-autonomous weapons system into an autonomous one. *See DOD DIRECTIVE, supra* note 110. As a result, the policy states that “weapon systems that are onboard or integrated with unmanned platforms must be designed such that, in the event of degraded or lost communications, the system does not autonomously select and engage individual targets or specific target groups that have not been previously selected by an authorized human operator.” *Id.* at 3.

regulate.¹⁸⁵ Yet these systems aren't being discussed,¹⁸⁶ at least in part because The Campaign frames the problem as the "numerous ethical, legal, moral, policy, technical and other concerns with fully autonomous weapons."¹⁸⁷ According to The Campaign, these weapons would, in the future, "be able to choose and fire on targets on their own, without human intervention."¹⁸⁸ This view of the problem is flawed on various levels.¹⁸⁹ As this article has discussed, there are no fully autonomous weapons.¹⁹⁰ Weapons systems with autonomy in the critical function of selecting and engaging targets without human intervention are not a looming Rubicon, but one crossed decades ago.¹⁹¹ To fully understand the odd duality of The Campaign being so successful in bringing attention to LAWS while obfuscating the international discussions that followed requires consideration of The Campaign's primary source documents, *Losing Humanity* and the *SR Report*.

III. CRITIQUING THE CAMPAIGN'S SOURCE DOCUMENTS: *LOSING HUMANITY* & THE *SR REPORT*

A. Moral Panic

Both of The Campaign's foundational documents, *Losing Humanity* and the *SR Report*, utilize moral panic to engender attention and support for their cause.¹⁹² The classic description of moral panic is:

A condition, episode, person or group of persons emerges to become defined as a threat to societal values and interests; its nature is presented in a stylized and stereotypical fashion by the mass

185. See Prado, *supra* note 163.

186. *Id.*

187. Learn, CAMPAIGN TO STOP KILLER ROBOTS, <http://www.stopkillerrobots.org/learn/> (last visited Feb. 16, 2016).

188. *Id.*

189. See Prado, *supra* note 163; Michael N. Schmitt & Jeffrey S. Thurnher, *Out of the Loop Autonomous Weapon Systems and the Law of Armed Conflict*, 4 HARV. NAT'L. SEC. J. 231, 243 (2013).

190. See *supra* notes 103–07 and accompanying text.

191. See ICRC REPORT, *supra* note 24.

192. See *SR Report*, *supra* note 3; *Losing Humanity*, *supra* note 8.

media; the moral barricades are manned by editors, bishops, politicians and other right-thinking people; socially accredited experts pronounce their diagnoses and solutions; ways of coping are evolved or (more often) resorted to; the condition then disappears, submerges or deteriorates and becomes more visible.¹⁹³

The two source documents employ moral panic to very different extents: the very title of *Losing Humanity* includes the term “killer robots,” while the *SR Report* avoids the term “killer” but opts for “robot” and uses hyperbolic language throughout the report itself.¹⁹⁴ To be clear, the moral panic begins with the use of the word robot, with or without the “killer” label.¹⁹⁵ And the use of the word robot was—of course—deliberate, prompting images which elicit fear or revulsion in a way that terms like “LAWS” or “weapons system” do not.¹⁹⁶

193. STANLEY COHEN, *FOLK DEVILS AND MORAL PANICS: THE CREATION OF THE MODS AND THE ROCKERS* 1 (1972); see also Sheldon Ungar, *Moral Panic Versus the Risk Society: The Implications of the Changing Sites of Social Anxiety*, 52 BRIT. J. SOC. 271 (2001) (comparing moral panic with the potential political catastrophes of a risk society).

194. See *SR Report*, *supra* note 3; *Losing Humanity*, *supra* note 8.

195. See *infra* Section III.A.

196. See Norri Kageki, *An Uncanny Mind: Masahiro Mori on the Uncanny Valley and Beyond*, IEEE SPECTRUM (June 12, 2012), <http://spectrum.ieee.org/automaton/robotics/humanoids/an-uncanny-mind-masahiro-mori-on-the-uncanny-valley> (describing the evolution of the idea that “people would react with revulsion to humanlike robots, whose appearance resembled, but did not quite replicate, that of a real human”). This is known as the “uncanny valley,” the idea that humans find inanimate objects aesthetically pleasing when they look similar but not too similar to human beings. *Id.* As the theory is plotted along a graph, human reaction to human-like things is increasingly positive, until the point where an inanimate object is “too” lifelike, leading to the graph plummeting to reflect fear and revulsion. *Id.* This precipitous drop is the “uncanny valley.” *Id.* But see Joel Garreau, *Bots on the Ground*, WASH. POST (May 6, 2007), <http://www.washingtonpost.com/wp-dyn/content/article/2007/05/05/AR2007050501009.html> (describing the attachment U.S. Service members develop towards robotic systems that do not resemble humans). Garreau explains how a U.S. Army Colonel canceled the remainder of a test in which a five-foot long robot modeled on stick insects was used to locate mines. *Id.* The robot located the mine by stepping on and detonating the mine, which would blow off one of the robot’s pneumatic actuators—or in anthropomorphic terms, its leg—after which the robot continued, per its programming, on a route to locate more mines. *Id.* The robot had blown off all but one “leg,” which it was using to drag itself forward, prompting the colonel to call the test “inhumane.” *Id.* Similarly, U.S. service members have awarded promotions and awards to machines, primarily “bots” used to search for improvised explosive devices. *Id.* The bots become “part of the team” and receive a name, and the soldiers “get upset when anything happens to one of the team.” *Id.*

1. *Losing Humanity*

There is no ambiguity as to why *Losing Humanity* includes the term “killer robots” in its title.¹⁹⁷ As a member of Human Rights Watch (and global coordinator for The Campaign) explained:

We put killer robots in the title of our report to be provocative and get attention. . . . It’s shameless campaigning and advocacy, but we’re trying to be really focused on what the real life problems are, and killer robots seemed to be a good way to begin the dialogue.¹⁹⁸

That statement is certainly correct as to being provocative and, with that, gaining attention.¹⁹⁹ But evoking nightmarish images from science fiction movies and technology, which do not now and may never exist, is the opposite of focusing on real life problems. And a provocative title hardly seems a good way to begin a dialogue, or a reasoned one anyway.

The report itself utilizes moderate and reasonable language,²⁰⁰ so there may be a temptation to view the handful of instances where it uses the term “killer robots” simply as clever and effective marketing. And it is. But using “killer robots” comes at a cost: provoking people to envision a potential, future harm makes it that much harder for *Losing Humanity* to acknowledge and explain that autonomous weapons have long been in use, and with little controversy.²⁰¹ This in turn leads to exempting extant weapons systems by labeling them as automated or automatic and not autonomous, despite their capability to select and engage targets without human intervention.²⁰²

Arguing that the international community should now ban certain systems that have been used for decades was always going to be a challenge, but the use of “killer robots” exacerbated that challenge. A year later, the UN Special Rapporteur followed suit.²⁰³

197. See Eveleth, *supra* note 32.

198. See *id.*

199. See *id.*

200. As discussed *infra* Section II.A.2, the reverse is true for the *SR Report*, which, while using the slightly more measured lethal autonomous robots, is replete with melodramatic hyperbole.

201. See *supra* Section II.A.

202. *Id.*; *Losing Humanity*, *supra* note 8, at 9.

203. See *infra* Section II.A.2.

2. *SR Report*

In 2013, the UN's Human Rights Council published a report by the Special Rapporteur on extrajudicial, summary, or arbitrary executions that focused on "lethal autonomous robotics and the protection of life."²⁰⁴ While the UN's office of the High Commissioner for Human Rights contends that "[t]he Special Rapporteur is guided primarily by international legal standards,"²⁰⁵ the report reflects something very different. Rather than legal standards, the *SR Report* uses redolent language to generate both interest and urgency.²⁰⁶ As with *Losing Humanity*, using emotional pulls as a "hook" is not problematic per se, provided that what follows is some combination of law and fact.²⁰⁷ But the *SR Report* employs moral panic as a means and an end.²⁰⁸ In self-serving (and sustaining) fashion, the report introduces ominous and foreboding language and then claims the concerns that arise as a basis for a moratorium.²⁰⁹ While *Losing Humanity* employs vague and unapplied terminology to skip over conceptual gaps, the *SR Report* confuses and conflates.²¹⁰

The *SR Report* utilizes the term Lethal Autonomous Robots or LARs.²¹¹ While certainly not the first to use that term,²¹² the report's use of the word "robots" is not helpful to the discussion.²¹³ The word "robot" is ambiguous, and subject to debate and interpretation,²¹⁴ including "whether a device must

204. *SR Report*, *supra* note 3, ¶ 1.

205. *International Standards*, UNITED NATIONS HUM. RTS. OFF. HIGH COMMISSIONER, <http://www.ohchr.org/EN/Issues/Executions/Pages/InternationalStandards.aspx> (last visited Oct. 30, 2016).

206. See *infra* Section III.C.2; see, e.g., *SR Report*, *supra* note 3, ¶ 95 ("[T]he strength of the intuitive reactions that the use of LARs is likely to elicit cannot be ignored.").

207. See *infra* Section III.A.

208. See *SR Report*, *supra* note 3.

209. See *infra* Section III.C.2; see, e.g., *SR Report*, *supra* note 3, ¶ 76 ("Robots have no moral agency and as a result cannot be held responsible in any recognizable way if they cause deprivation of life that would normally require accountability if humans had made the decisions. Who, then, is to bear the responsibility?").

210. See *supra* Sections II.A.1–2.

211. See *supra* note 215 and accompanying text.

212. See, e.g., Jeffrey S. Thurnher, *No One at the Controls: Legal Implications of Fully Autonomous Targeting*, 67 JOINT FORCES Q., no. 4, 2012, at 77 (2012), http://ndupress.ndu.edu/Portals/68/Documents/jfq/jfq-67/JFQ-67_77-84_Thurnher.pdf.

213. See *infra* note 216 and accompanying text.

214. Rain Livvoja, *Emerging Technologies of Warfare*, in ROUTLEDGE HANDBOOK OF THE LAW OF ARMED CONFLICT 11 (2016); see also ICRC REPORT, *supra* note 24, at 61 (quoting a group of

have some meaningful degree of autonomy in order to be deemed a robot.”²¹⁵ The words “autonomy” and “robot” each depend on how the other is defined, creating a needless (and unhelpful) etymological loop.²¹⁶ Using the term “robots” does, however, provides a useful base upon which the *SR Report* can later histrionically heap.²¹⁷ To do so, the report first incorrectly claims terminology equivalence.²¹⁸

The *SR Report* contends that there is a “widely used definition (endorsed inter alia by both the United States Department of Defense and Human Rights Watch)” of LARs.²¹⁹ In support, the *SR Report* cites to the DoD Directive on Autonomy in Weapons, but the directive does not use the term robot or robotics.²²⁰

The *SR Report* is correct that there is a shared focus on “weapon systems that, once activated, can select and engage targets without further intervention by a human operator.”²²¹ But the report then problematically claims that “[t]he important element is that the robot has an autonomous ‘choice’ regarding selection of a target and the use of lethal force.”²²²

The use of the word “choice” following the word autonomous is either a non sequitur, fearmongering, or both.²²³ “Choice” suggests arbitrariness—that a system could, after processing the same data at different times,

scientists’ summary of “what might be considered as robotic military systems”). The implication of “what might be” is that there is no consensus. ICRC REPORT, *supra* note 24, at 61. From a paragraph-long summary we learn that most robots are mobile and do not carry human operators, but neither of those aspects are essential features of a robot. *See id.* The summary discusses the spectrum of autonomy, and notes that, to be a robot, a device cannot depend entirely on a human operator. *Id.* The resulting broad and varying range of what may or may not properly be considered robotic is why adding to the already confused discussion on autonomy is not helpful. *See id.*

215. *See supra* note 214 and accompanying text.

216. The U.N. Special Rapporteur has continually tried to keep LARs and the term “robot” in the discussion. *See* Christof Heyns, *Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions*, ¶ 133, U.N. Doc. A/HRC/26/36 (Apr. 1, 2014). In 2014, the *SR Report* reads as if LAWs and LARs are interchangeable. *Id.*

217. At least *Losing Humanity* has acknowledged the rationale behind the use of the “killer robots” language. *See Losing Humanity*, *supra* note 8; *see also* Eveleth, *supra* note 32.

218. *See infra* note 219 and accompanying text.

219. *SR Report*, *supra* note 3, ¶ 38.

220. *Id.* (referring to DOD DIRECTIVE); *see* DOD DIRECTIVE, *supra* note 110.

221. *SR Report*, *supra* note 3, ¶ 38.

222. *Id.*

223. *See Choice*, Merriam-Webster.com, <http://www.merriam-webster.com/dictionary/choice> (last visited Oct. 11, 2016) (defining choice as “the act of picking or deciding between two or more possibilities” or “the opportunity or power to make a decision”).

“choose” to take different actions in one instance versus another.²²⁴ This is not correct. “As a fundamental principle . . . the actions of a program or robot are bounded by the information it has, the amount of time available for computation and the limitations of its algorithms—thus, the independence . . . is fixed by the designers.”²²⁵ This suggests that a weapons system could, at separate times, receive the same data but “choose” to respond differently.²²⁶

The *SR Report* contends that “[b]ased on current experiences of [armed unmanned aerial systems], there is a reason to believe that States will inter alia seek to use LARs for targeted killing.”²²⁷ The claim—that “current experiences” with armed UAS support a belief on the future use of LAWS—is both illogical and incorrect.²²⁸ It’s illogical because there is no connection between the two weapons systems:²²⁹ that armed UAS have been employed over the last decade doesn’t suggest anything about the development and use of LAWS.²³⁰ It’s incorrect because there have been over thirty years of state practice in which LAWS haven’t been used for targeted killings, and in the United States, there is a written policy on autonomous weapons systems that prohibits “selecting humans as targets.”²³¹ Of course state practices can

224. *See id.*

225. DSB REPORT, *supra* note 71, at 11 (referring to Simon’s Law of Bounded Rationality).

226. The *SR Report* makes the statement about robots making choices in paragraph thirty-eight. *SR Report*, *supra* note 3, ¶ 38. Six paragraphs later, the report claims that popular culture “often assigns human-like attributes to robots.” *Id.* ¶ 44. Claiming that robots make choices is an example of this type of assignment. The *SR Report* reads as if it was written by several people who have quite different views on the topic. In one paragraph it talks of robots choosing, but in another it refers to robotic “decisions” using the word in quotes, reflecting that robots aren’t actually deciding. *Id.* ¶¶ 38–39. And the report quite correctly states robots do not have free will or moral agency while later claiming the world order ending issues these systems create “will, quite literally, be taken out of human hands.” *Id.* ¶ 110.

227. *Id.* ¶ 47.

228. *Id.*; *see infra* notes 229–32 and accompanying text.

229. *See infra* notes 230–32 and accompanying text.

230. *See* Scharre & Horowitz, *supra* note 25, at 8; *see also infra* note 231–232.

231. DoD DIR., *supra* note 110, at 3. While the *SR Report* assumes the inevitability of LAWS development, there are policy-imposed limitations from recent history that show the opposite. *See, e.g., Helicopters*, COMBAT AIRCRAFT, <http://www.combataircraft.com/en/Military-Aircraft/Helicopter/> (last visited Oct. 11, 2016). Armed helicopters have existed for over fifty years, yet in the U.S., police helicopters have never been weaponized. Robert Meisner, *Advanced Simulation And Computing Program Plan*, NNSA (Oct. 2008), https://nnsa.energy.gov/sites/default/files/nnsa/inlinefiles/ASC_FY09_PPlan.pdf. And, more apt to the LAWS discussion, the U.S. could have made its nuclear response process quicker by assigning more functions to computers. Instead the U.S. policy relied on less efficient humans to launch nuclear-equipped missiles. *See, e.g., SR*

change and policies can be modified, but the *SR Report* ignores both state practice and policy concerning LAWS while asserting (but not supporting) a nonexistent correlation between the employment of armed UAS and LAWS.²³²

The *SR Report* acknowledges that “[t]he use of emotive terms such as ‘killer robots’ may well be criticized.”²³³ Yet according to the *SR Report*, “the strength of the intuitive reactions that the use of LARs is likely to elicit cannot be ignored.”²³⁴ Thus, the report disingenuously claims that the reaction to a term the *SR Report* introduced cannot be ignored. The use of “killer robots” proves the rhetorical floor. For no discernible reason other than to engender moral panic, the *SR Report* notes that LAWS have been “depicted as treating people like ‘vermin’, who are ‘exterminated.’”²³⁵ If that were not enough, the *SR Report* claims that such descriptions “conjure up the image of LARs as some kind of mechanized pesticide.”²³⁶

While *Losing Humanity* and the *SR Report* successfully leverage moral panic in marketing terms, its usage dooms the very discussion it enabled.²³⁷ *Losing Humanity* and the *SR Report* try to reconcile their futuristic fearmongering with the long-standing use of LAWS.²³⁸ But generalized distinctions between automatic and automated, and decision-making as a loop do not alter the inevitable—a conceptual cul-de-sac of their own making, brought about by and through the use of the term “killer robots” and

Report, *supra* note 3. Could those policy choices be changed? Of course. But that they haven’t over such a long period of time suggests that policy choices may be entitled to more deference than what the *SR Report* afforded them.

232. While the *SR Report* in particular reads as if western militaries are preoccupied with the prospect of utilizing and defending against LAWS, a recent U.S. Army wargame suggests otherwise. Eric Iverson, *Wargame to Examine the Fall of a ‘Megacity,’* U.S. ARMY (Aug. 18, 2014), http://www.army.mil/article/131994/Wargame_to_examine_the_fall_of_a_megacity/. The wargame, named Unified Quest, “examines a variety of feasible mid- to long-range strategic and operational settings and explores a broad set of ideas about future conflict.” *Id.* Set in the year 2035, the wargame featured “a city of more than 10 million people . . . in a state of crisis plagued by insurgency, internal corruption and struck by a natural disaster in the form of a major flood.” *Id.* Killer robots, however, did not play a role in the wargame. *See id.* The U.S. Army apparently believes it is far more likely that it will be fighting in urban combat in large cities and in the tunnels and sewers underneath, than with and against robots. *See id.*

233. *SR Report*, *supra* note 3, ¶ 95.

234. *Id.*

235. *Id.* ¶ 96.

236. *Id.*

237. *See generally SR Report*, *supra* note 3; *Losing Humanity*, *supra* note 8.

238. *See supra* Section II.A.

discussions of full autonomy.

B. Conceptual Paradoxes

1. *Losing Humanity*

Losing Humanity's definitional confusion begins in the second sentence of the report.²³⁹ The report contends that "[s]ome military and robotics experts have predicted that 'killer robots'—fully autonomous weapons that could select and engage targets without human intervention—could be developed within 20 to 30 years."²⁴⁰ Moving beyond the points that fully autonomous weapons do not exist and that weapons systems that select and engage targets without human intervention have existed for decades, the report forecasts potential harm from potential systems—some 20 to 30 years in the future.²⁴¹ Yet in trying to explain what it is about these potential systems that would be so problematic, *Losing Humanity* has to distinguish them from current weapons systems.²⁴² While that would be a challenging enough undertaking, *Losing Humanity* also tries to include some of these current weapons systems within the ambit of future worrisome systems.²⁴³ This is a logic circle that *Losing Humanity* (nor anyone for that matter) cannot square.

The Human Rights Watch and the International Human Rights Clinic's efforts to avoid the conceptual corner into which they painted themselves in *Losing Humanity* begin at the outset of the report, in a section on definitions and terminology.²⁴⁴ The section divides robotic weapons into three categories but never clearly defines their parameters.²⁴⁵ Those categories are:

239. *Losing Humanity*, *supra* note 8, at 1.

240. *Id.*

241. *Id.*

242. *Id.* at 3. Or, alternatively, the report should explain why concerns over decades-old autonomous weapons only manifested themselves in 2012. *See id.*

243. *Id.* at 1.

244. *See id.* at 2.

245. *Id.* *Losing Humanity* also refers to levels of autonomy. *See id.* at 2–3. As discussed, thinking autonomy in levels is an unhelpful taxonomy given the dynamic nature of functions within a system that operate concurrently and sequentially, and with varied allocations to computers or humans. *See supra* Part I.

[1] Human-*in*-the-Loop Weapons: Robots that can select targets and deliver force only with a human command;

[2] Human-*on*-the-Loop Weapons: Robots that can select targets and deliver force under the oversight of a human operator who can override the robots' actions; and

[3] Human-*out-of*-the-Loop Weapons: Robots that are capable of selecting targets and delivering force without any human input or interaction.²⁴⁶

The report fails to provide even a single example of weapons systems in which humans are in-, on-, or out-of-the-loop, which is telling of the categorization's lack of utility.²⁴⁷ The report then contends that "[t]he term 'fully autonomous weapon' refers to both out-of-the-loop weapons [category 3 above] and those that allow a human on the loop [category 2 above], but that are effectively out-of-the-loop weapons because the supervision is so limited."²⁴⁸

Thus some, but not all, human-on-the-loop weapons should be considered fully autonomous.²⁴⁹ But the only criterium *Losing Humanity* provides to subdivide human-on-the-loop weapons is whether the human supervision is "so limited" that that the weapons "are effectively out-of-the-loop weapons."²⁵⁰ Again, the report provides no examples of weapons systems on either side of the "so limited" line, nor does it define or explain what constitutes "so limited" human supervision.²⁵¹

Having defined, however generally, in-, on-, and out-of-the-loop at the beginning of the report, *Losing Humanity* curiously fails to apply or even mention the terms in the substantive chapter discussing current autonomous weapons.²⁵² Instead, the report uses the term "automatic weapons defense systems," a term omitted from the definitions and terminology section.²⁵³

246. *Losing Humanity*, *supra* note 8, at 2.

247. *Id.*

248. *Id.* The report then reiterates that "[f]ully autonomous weapons, which are the focus of this report, do not yet exist." *Id.*

249. *See generally id.*

250. *Id.*

251. *Id.*

252. *See id.* at 6–13.

253. *See id.* at 2, 9.

a. Automatic Weapons Defense Systems

The first substantive section of the report is entitled “Unmanned Robots and the Evolution Toward Fully Autonomous Weapons.”²⁵⁴ In this section, the report attempts to account for the long-standing use of a number of weapons systems capable of selecting and engaging targets without human intervention.²⁵⁵ Under the heading “Automatic Weapons Defense Systems,” the report lists several systems, including the U.S. Phalanx and C-RAM systems, Israel’s Iron Dome, and Germany’s Mantis.²⁵⁶

The report claims that “[t]hese systems are designed to sense an incoming munition, such as a missile or rocket, and to respond automatically to neutralize the threat.”²⁵⁷ This description is disingenuous by omission.²⁵⁸ The defense systems are designed to sense and respond not to munitions, but threats.²⁵⁹ Threats come in a variety of forms including but certainly not limited to missiles and rockets. As the website for the Phalanx explains, it’s also designed to “be used against helicopters and high-speed surface craft at sea.”²⁶⁰ And, where the Phalanx successfully targets a helicopter or surface craft, the likely results are injury or death to the human pilots and crew.²⁶¹

While ignoring this, the report contains the U.S. Navy’s description of the Phalanx as “the only deployed close-in weapon system capable of *autonomously* performing its own search, detect, evaluation, track, engage and kill assessment functions.”²⁶² Indeed the report acknowledges that “[t]hese weapon defense systems have a significant degree of autonomy,” but they “fall short of being fully autonomous.”²⁶³ Instead, the report claims such weapons systems “can better be classified as automatic.”²⁶⁴

254. *Id.* at 6.

255. *Id.*

256. *Id.* at 9–11.

257. *Id.* at 9.

258. *See infra* note 381 and accompanying text.

259. *Cf. Convention on Cluster Munitions*, UNITED NATIONS OFF. GENEVA, [http://www.unog.ch/80256EE600585943/\(httpPages\)/F27A2B84309E0C5AC12574F70036F176?OpenDocument](http://www.unog.ch/80256EE600585943/(httpPages)/F27A2B84309E0C5AC12574F70036F176?OpenDocument) (last visited Oct. 31, 2016).

260. *Phalanx*, *supra* note 126.

261. *Id.*

262. *Losing Humanity*, *supra* note 8, at 10 (emphasis added).

263. *Id.* at 12. This is true but not particularly helpful, because all weapons systems fall short of being fully autonomous. *See id.*

264. *Id.*

The reason *Losing Humanity* doesn't discuss the fact that defensive weapons systems target threats with human operators and crews, in addition to munitions, is because of the untenable place such acknowledgement takes the argument. The proposal is a ban of autonomous systems—if a weapons system is automatic, it's not covered.²⁶⁵ And while *Losing Humanity* discusses how some extant weapons should be included in the ban, it can't articulate which ones.²⁶⁶ So it's far more palatable that automatic defensive weapons be thought of as only targeting things—inanimate objects like missiles and rockets and not people, but it's not accurate.²⁶⁷

And while the difference between automated and autonomous is significant in *Losing Humanity*, it's four pages into a four-and-a-half-page section where the term automatic is generally described—not even defined.²⁶⁸ The report uses Professor Sharkey's example of an automatic "robot arm painting a car,"²⁶⁹ in contrast to an autonomous robot, which functions "in open and unstructured environments."²⁷⁰ As previously discussed, this description is useful as a means to understand the differences in machine complexity but not to categorize where an individual weapons system is properly placed on the automatic–automated–autonomous spectrum.²⁷¹ Moreover, this shifts the focus to overall categorization when the most important consideration is whether the weapons system selects and engages targets without further human intervention.²⁷²

It is challenging to reconcile *Losing Humanity*'s definitional focus on in-, on-, or out-of-the-loop and the substantive portion on automatic weapons defense systems. Nowhere in that later substantive section are the terms in-, on-, or out-of-the-loop used, nor is there any discussion about how much or what kind of human supervision is required before an on-the-loop system is considered out-of-the-loop or fully autonomous.²⁷³

The report seems to obviously include, while not admitting as much, at

265. See generally *Losing Humanity*, *supra* note 8.

266. See *id.* at 46.

267. See *id.*

268. *Losing Humanity*, *supra* note 8, at 9.

269. *Id.* (quoting Neil Sharkey, *Automating Warfare: Lessons Learned from the Drones*, 21 J. L. INFO. & SCI. 140, 141 (2012)).

270. *Id.* at 12.

271. See *supra* notes 89–95 and accompanying text.

272. See *supra* note 246 and accompanying text.

273. See *Losing Humanity*, *supra* note 8, at 9.

least some automatic weapons defense systems as equivalent to fully autonomous.²⁷⁴ The section on automatic weapons states that “[h]uman involvement, when it exists at all, is limited to accepting or overriding the computer’s plan of action in a matter of seconds.”²⁷⁵

Presumably, a lack of human involvement or one limited to a matter of seconds would be included in the “too limited” supervision, but the report fails to apply its own definitions and terminology.²⁷⁶ Having not used in-, on-, or out-of-the-loop descriptions in the section on automatic weapons defense systems, the following section begins with “[o]ther unmanned systems that currently retain humans in or on the loop are also precursors to fully autonomous weapons.”²⁷⁷ Using “other” presumably means in addition to the systems just discussed—automatic weapons defense systems.²⁷⁸

Why is there an aversion to referring to automatic weapons defense systems as in-, on-, or out-of-the-loop, as well as an aversion to identifying how limited the human supervision must be to qualify a system as out of the loop?²⁷⁹ There are at least two reasons for these omissions: (1) the in-, on-, and out-of-the-loop categorizations and the “so limited” time delineation aren’t functionally useful,²⁸⁰ and (2) any specificity in applying either would yield the pragmatically untenable result of current weapons being included within the ambit of a desired ban against future “killer robots.”²⁸¹ That *Losing Humanity* fails to include this information, and more importantly, why it really couldn’t include it are critically important manifestations of a flawed conceptual framework. That framework has migrated to the *SR Report* and helps explain, at least in part, The Campaign’s lack of success at the CCW.²⁸²

274. *See id.*

275. *Id.* Elsewhere in the section, the report refers to automatic weapons defense systems as operating with “limited intervention from humans.” *Id.* at 12. The report fails to discuss whether this limited intervention is above or below the “so limited” line the report itself established to distinguish an out-of-the-loop weapon. *See id.*

276. *See supra Losing Humanity*, note 273 and accompanying text.

277. *Losing Humanity*, *supra* note 8, at 13.

278. *Id.*

279. *See supra* notes 273–78 and accompanying text.

280. *See Losing Humanity*, *supra* note 8, at 2.

281. *Id.* at 1.

282. *See supra*, notes 5–9 and accompanying text.

b. Lack of Functional Utility

The first reason for *Losing Humanity*'s lack of specificity (and examples) is that the in-, on-, and out-of-the-loop categorization is of minimal utility beyond its use as a generalized descriptor of human involvement with machines in one spectrum.²⁸³ It oversimplifies the complexity of autonomy, as evidenced by its lack of applied utility.²⁸⁴ How should one categorize a torpedo or missile that is fired by human action but then performs a number of active and passive functions designed to identify, prioritize, and engage a target?²⁸⁵ Aspects of such weapons fit under the *Losing Humanity* definition for in- and on- and out-of-the-loop.²⁸⁶ Similarly, a number of current weapons select and engage a target without human intervention, though a human can override or abort a launch or firing.²⁸⁷ Under *Losing Humanity*'s definitions, such a system would be both a human on and out of the loop weapon.²⁸⁸

c. Practical Reasons

The second reason why *Losing Humanity* fails to provide meaningful specificity is that if the report clarified the automatic weapons defense systems—in which human involvement is so limited as to render them “fully autonomous”—these systems would be caught up in the report's call for ban.²⁸⁹ That would mean calling on countries to ban not just future, undeveloped weapons systems, but any number of current weapons systems, which for decades have played an important role in the militaries of over thirty countries.²⁹⁰

283. *Losing Humanity* is by no means the first or only report to utilize in-, on-, and out-of-the-loop to describe weapons systems. See, e.g., DSB REPORT, *supra* note 71. The DSB REPORT uses the terms at several points in its 2012 report, but only as a descriptor, not as means of differentiation. *Id.* The DoD directive does not contain a single reference to in-, on-, or out-of-the-loop. DOD DIRECTIVE, *supra* note 110.

284. See, e.g., Scharre & Horowitz, *supra* note 25, at 8.

285. See, e.g., *id.*

286. See *Losing Humanity*, *supra* note 8, at 2.

287. See, e.g., Scharre & Horowitz, *supra* note 25, at 12–13.

288. See *Losing Humanity*, *supra* note 8, at 2.

289. *Id.*; see *infra* Section III.C.1.

290. See *Losing Humanity*, *supra* note 8. And while money is not and should not be the primary consideration by which the international community makes decisions, there is a tremendous sunk cost in autonomous weapons. Considering the number of countries which have utilized them for

The report's authors know such a request is not realistic²⁹¹ and that it raises questions for which there do not appear to be satisfying answers.²⁹² For example, if the limited nature of the Phalanx's human supervision qualifies the system as the functional equivalent of a fully autonomous weapon, which should be banned, considerable explanation would be necessary.²⁹³ If the Phalanx, which moves from threat detection to engagement with lethal force in less than three seconds,²⁹⁴ isn't the kind of system the report envisions as involving too limited human supervision, one wonders what system would, and why the Phalanx would be included in the report.²⁹⁵

The report ducks any meaningful characterization of automatic weapons defense systems.²⁹⁶ Instead, the report claims that "further study" of automatic weapons is warranted.²⁹⁷ It is puzzling that weapons systems that have been in existence for decades require further study, yet *Losing Humanity* has no difficulty in reaching conclusions about future, undeveloped weapons systems.²⁹⁸ While reaching a similar conceptual dead end, the *SR Report* does so through a different, albeit equally vague and contradictory path.²⁹⁹

2. *SR Report*

Similar to *Losing Humanity*, the *SR Report* paradoxically attempts to distinguish extant autonomous weapons systems from LARs while simultaneously including but not specifying some extant weapons systems

decades, the cost of research, development, and fielding these systems is in the billions of dollars. *See id.*

291. Consider the enormity of the ban applied to just Phalanx, which is "installed on all U.S. Navy surface combatant ship classes and on those of 24 allied nations." *Phalanx*, *supra* note 126.

292. *See infra* note 358 and accompanying text.

293. *See Phalanx*, *supra* note 126.

294. *See Phalanx Gatling Gun (CIWS)*, BOMBSHOCK, http://www.bombshock.com/weapons_combat/firearms/phalanx-gatling-gun-ciws.html (last visited Oct. 31, 2016). Publicly, the U.S. Navy simply refers to the Phalanx as having a "fast reaction time." *MK 15-Phalanx Close-in Weapons System (CIWS)*, AM.'S NAVY, http://www.navy.mil/navydata/fact_display.asp?cid=2100&tid=487&ct=2 (last visited Oct. 31, 2016).

295. *Losing Humanity*, *supra* note 8, at 9.

296. *See generally id.*

297. *Id.* at 12.

298. *See id.* at 6, 16–19 ("[T]he military of the future will be increasingly unmanned.").

299. *See infra* Section III.A.2.

as LARs.³⁰⁰ The non sequitur's end result is a detailed call for a moratorium of systems not explained with anything resembling the specificity needed to actually implement the called-for moratorium.³⁰¹

The *SR Report* utilizes a form of the in-, on-, and out-of-the-loop continuum similar to but less useful than the minimal utility of *Losing Humanity*'s version.³⁰² *Losing Humanity* at least generally defined in-, on-, and out-of-the-loop,³⁰³ and while unhelpfully vague about where and how to demarcate between them, identified general categories of weapons systems that would be included in a ban.³⁰⁴

The *SR Report* positions armed "robots" at one end of the continuum based on their "significant human involvement" and because there is "a human in the loop."³⁰⁵ At the other end of the spectrum are full autonomy and LARs, where humans are "out of the loop."³⁰⁶ The resulting continuum is unworkable as the end, and even the mid-points, are not defined.³⁰⁷

The *SR Report* attempts to anchor the left side of the continuum—"the human in the loop" end—with "UCAVS," which the report describes as unmanned combat aerial vehicles, such as the Predator.³⁰⁸ But what is it about UCAVs that represents "significant human involvement"?³⁰⁹ Perhaps the significant human involvement is that the Predator launches a missile while a human pilot, located somewhere else, directs the firing?³¹⁰ But without knowing what significant human involvement means, the left side of the continuum is untethered.³¹¹

300. See generally *SR Report*, *supra* note 3, ¶ 50.

301. See generally *id.* ¶ 118.

302. *Id.* ¶ 41.

303. *Losing Humanity*, *supra* note 8, at 2.

304. See *id.* at 2, 46.

305. *SR Report*, *supra* note 3, ¶ 39.

306. *Id.* ¶ 41.

307. See generally *id.*

308. See *id.* ¶ 26. The *SR Report* refers to UCAVs as robotic and possessing some measure of autonomy. *Id.* ¶ 39. Under the *SR Report* they are autonomous robots; and in firing missiles, they are certainly lethal. However, they are also not, because the *SR Report* claims a LAR has an autonomous choice "regarding selection of a target and the use of lethal force," which UCAVs do not have. *Id.* ¶ 38. Thus, under the *SR Report*'s framework, UCAVs both are and are not LARs. See *id.*

309. *Id.* ¶ 39.

310. See *infra* note 311 and accompanying text.

311. And the UCAV is a relatively easy example. See *supra* notes 305–09 and accompanying text. What about the "fire-and-forget" systems, which require a human to fire, but after launch the

The other end of the continuum, humans out-of-the-loop, is full autonomy and LARs.³¹² Yet, as discussed, there are no fully autonomous systems (and may never be).³¹³ The *SR Report* acknowledges the former point, that “robots with full lethal autonomy have not yet been deployed.”³¹⁴ So the right end of the continuum is unbounded and may not ever exist.³¹⁵

The *SR Report* then attempts to mark and parse out mid-points of the continuum and differentiate between types of on-the-loop systems.³¹⁶ This only reinforces that the in-, on-, and out-of-the-loop characterization is of minimal utility beyond as a general descriptor of one spectrum of autonomy.³¹⁷

The *SR Report* discusses “supervised autonomy,” where a human is “on the loop [and] monitors and can override the robot’s decisions.”³¹⁸ While *Losing Humanity* spoke of “so limited” human involvement and having only a “matter of seconds” to override machine action, the *SR Report* contends that the decision-making speed of robots is “often measured in nanoseconds.”³¹⁹ It is these unidentified systems where the *SR Report* concludes that “humans are de facto out of the loop and the machines thus effectively constitute LARs.”³²⁰ The *SR Report* does not even attempt to identify the parameters of when “supervised autonomy” qualifies a weapons system as a LAR.³²¹ That’s because parsing out supervised autonomy by time is both arbitrary and self-defeating.

weapons system refines or prioritizes which specific target to engage? See *SR Report*, *supra* note 3, ¶ 45; see also Ali Mohammadi, *Javelin Anti-Tank Guided Missile*, MIL. TODAY, <http://www.military-today.com/missiles/javelin.htm> (last visited Oct. 11, 2016).

312. See *SR Report*, *supra* note 3, ¶ 45.

313. See *Losing Humanity*, *supra* note 8, at 2.

314. *SR Report*, *supra* note 3, ¶ 45.

315. See *id.*

316. See *id.*

317. See generally Scharre & Horowitz, *supra* note 25, at 17.

318. *SR Report*, *supra* note 3, ¶ 41.

319. See *id.*; *Losing Humanity*, *supra* note 8.

320. See *SR Report*, *supra* note 3, ¶ 41; see also *Patriot Missile Long-Range Air-Defense System*, ARMY TECH., <http://www.army-technology.com/projects/patriot/> (last visited Oct. 11, 2016).

321. *SR Report*, *supra* note 3, ¶ 41.

a. Time as a measure of autonomy

Under the *SR Report*'s approach, certain supervised weapons systems—those whose decision-making is measured in nano-seconds—are de facto LARs.³²² The *SR Report* doesn't, however, list the systems that would thus qualify as LARs.³²³ Instead, the report delineates supervised weapons systems by decision-making processing time: nano-second decision-making time equals a de facto LAR.³²⁴ How or why that processing time was chosen is unclear. What about milliseconds? Tenths? A second? Even using nano-seconds, the *SR Report* never specifies the weapons systems that employ this decision-making time and are thus subject to the moratorium.³²⁵ The implication of the *SR Report* is that humans could replicate and even improve weapons system targeting by playing a more active role.³²⁶ This flies in the face of why current autonomous weapons were developed—to facilitate the effective engagement of multiple, high-performance, even supersonic threats within seconds (or milliseconds) *because* human beings are not effectively able to do so.³²⁷

Consider what a Patriot air defense system does in tracking up to 100 aerial objects up to 60 miles away, and providing intercept missile guidance data for up to nine missiles to engage up to nine different targets.³²⁸ This form of complexity occurs in all battlespace mediums—land, sea, and air—and there is no question as to machines' advantages over humans in collecting and evaluating long-range sensor data in time-compressed environments.³²⁹

322. *Id.*

323. *See id.* ¶¶ 37–49.

324. *Id.* ¶ 41.

325. *See id.*

326. *Id.* ¶¶ 55–56.

327. *See SEARAM Anti-Ship Missile Defense System*, RAYTHEON, <http://www.raytheon.com/capabilities/products/searam/> (last visited Oct. 11, 2016).

328. *Patriot Missile Long-Range Air-Defence System*, ARMY TECH., <http://www.army-technology.com/projects/patriot/> (last visited Oct. 11, 2016). The Patriot system identifies and distinguishes between multiple aerial objects, determining altitude, heading, speed, intercept trajectories, whether the object is manned, and even whether the object is carrying ordnance. *See* PEO MISSILES & SPACE, WEAPON SYSTEMS BOOK (2012), <https://www.msl.army.mil/Documents/peoWeaponSystems.pdf>; *see also* Marshall Brain, *How Patriot Missiles Work*, HOW STUFF WORKS (Mar. 28, 2003), <http://science.howstuffworks.com/patriot-missile.htm>.

329. *See, e.g., Stark's Missile System May Have Been Malfunctioning*, L.A. TIMES (May 24, 1987), http://articles.latimes.com/1987-05-24/news/mn-2304_1_missile-attack [hereinafter *Stark's*

b. Automatic vs. Autonomous

The *SR Report* then contends that “[a]utonomous needs to be distinguished from ‘automatic’ or ‘automated,’” but does not explain why that needs to occur.³³⁰ Similar to *Losing Humanity*, the *SR Report* provides an example that is not a weapons system and thus not particularly useful.³³¹ Resembling *Losing Humanity*’s reference to Professor Sharkey and robotic car painting, the *SR Report* describes automatic devices “such as household appliances [that] operate within a structured and predictable environment.”³³² These systems are to be distinguished from autonomous systems, which “can function in an open environment, under unstructured and dynamic circumstances.”³³³ It’s hard to determine which household appliance most closely resembles a weapons system’s functions, or the point of even trying to compare them.³³⁴ Focusing on the overall categorization of a weapons system diverts attention from where it should be—on whether man or machine is performing the critical function of engagement: selecting

Missile]. Consider the examples provided by the U.S.S. Stark and the U.S.S. Vincennes, two U.S. Navy warships. *See id.* In 1987, while the U.S.S. Stark was operating in the Persian Gulf, the ship was struck by two missiles fired by an Iraqi warplane, killing 37 U.S. sailors. *Id.* Among a host of contributing factors was that the Phalanx system on the Stark was malfunctioning and thus placed in a manual mode. *Id.* Had the Phalanx been operating properly and in autonomous mode, “it was the only system aboard the Stark that offered a realistic chance of defending the ship because the Iraqi warplane fired at such close range.” *Id.* In contrast, the following year the captain and crew of the U.S.S. Vincennes fired a missile at (and downed) what they thought was an Iranian warplane but was a civilian commercial aircraft, killing 290 passengers and crew. *See* John Bary & Roger Charles, *Sea of Lies*, NEWSWEEK (Jul. 12, 1992), <http://www.newsweek.com/sea-lies-200118> [hereinafter *Sea of Lies*].

The U.S.S. Vincennes incident did not involve an autonomous weapons system. *See id.* Instead, it is an example, contrary to *Losing Humanity*, of humans’ limited capacity for judging certain complex situations. *See id.*; *cf. Losing Humanity*, *supra* note 8, at 4.

In the case of the Vincennes, among other problems, the captain was fixated on Iranian gunboats some distance away. *See Sea of Lies*, *supra*. The Vincennes crew misinterpreted accurate data from systems on the Vincennes concerning the plane. *Id.* One lesson from the Vincennes is the need to constantly assess and improve how systems convey information to humans. *See* Luke Swartz, *Overwhelmed by Technology: How Did User Interface on Board the USS Vincennes Lead to 290 Dead?*, <http://xenon.stanford.edu/~lswartz/vincennes.pdf> (last visited Oct. 32, 2016).

330. *SR Report*, *supra* note 3, ¶ 41.

331. *Id.* ¶ 42.

332. *Id.*

333. *Id.* This is essentially the same as *Losing Humanity*’s version of autonomous, which requires “open and unstructured environments.” *Losing Humanity*, *supra* note 8, at 12.

334. *See SR Report*, *supra* note 3, ¶ 42.

targets and then launching or firing lethal force at those targets.³³⁵

The *SR Report* then takes a step *Losing Humanity* did not, and at least references current weapons systems using terminology from the report.³³⁶ It is unclear which is worse, *Losing Humanity* not taking the step or the manner by which the *SR Report* does so.³³⁷ The *SR Report* lists several weapons systems, including the U.S. Phalanx and CRAM systems, Israel's Harpy, the U.K.'s Taranis, and South Korea's Techwin security guard robot.³³⁸ Yet with the exception of the Harpy, the *SR Report* labels the systems "automatic."³³⁹ According to the *SR Report*, these systems are akin to household appliances, and the weapons systems operating environment—armed conflict—is thus a structured and predictable environment, which thus far has never been a descriptor of warfare.³⁴⁰

If the *SR Report* was correct that the systems are not autonomous, it would mean that none of the systems, except Israel's, would be considered LARs; and consequently, none would fall under the SR's called-for moratorium.³⁴¹ But, of course, it is not correct. All of the systems are autonomous weapons.³⁴² All are capable of selecting and engaging a target without human intervention.³⁴³

And not surprisingly, the conceptual dissonance within both documents leads to flawed proposals: calls for a ban or moratorium that do not nor

335. See *id.* ¶ 45.

336. See *id.*

337. See generally *Losing Humanity*, *supra* note 8.

338. See *SR Report*, *supra* note 3, ¶ 45.

339. *Id.*

340. But see ICRC REPORT, *supra* note 24, at 18 (describing how the British Ministry of Defence distinguishes between automated and autonomous, stating that only weapons systems "capable of understanding higher intent and direction" are autonomous). The British Military contends its defensive weapons systems are automated. *Id.* This would seem to be an overall characterization and not a characterization based on the function of engagement. While much of this article focuses on The Campaign's motivations to label extant systems as something other than autonomous, this is an example of a State doing the same thing. The result is a bizarre but appropriate reflection of the current LAWS discussion. As discussed, the British Navy employs the Phalanx system and contends it is automatic. See *id.* The ICRC and the manufacturer of the Phalanx refer to as it autonomous. See *id.* To the United Kingdom's credit however, they and the United States are the only countries to have developed and released national policies on autonomous weapons systems. See *id.*

341. See *id.* The *SR Report's* rationale for labeling U.S. and Korean weapons "automatic" while listing Israel's as autonomous is unclear. See *SR Report*, *supra* note 3, ¶ 45.

342. See *SR Report*, *supra* note 3, ¶ 45.

343. See *id.*

cannot specify the subject of the regulation they propose.³⁴⁴

C. Flawed Proposals

1. *Losing Humanity's* Call for a Ban

The report concludes with a series of recommendations.³⁴⁵ The first and most significant is that all countries should “[p]rohibit the development, production, and use of fully autonomous weapons through an international legally binding instrument.”³⁴⁶

States should preemptively ban fully autonomous weapons because of the threat these kinds of robots would pose to civilians during times of war. A prohibition would ensure that firing decisions are made by humans, who possess the ability to interpret targets’ actions more accurately, have better capacity for judging complex situations, and possess empathy that can lead to acts of mercy. Preserving human involvement in the decision-making loop would also make it easier to identify an individual to hold accountable for any unlawful acts that occur from the use of a robotic weapon, thus increasing deterrence and allowing for retribution.

This prohibition should apply to robotic weapons that can make the choice to use lethal force without human input or supervision. It should also apply to weapons with such limited human involvement in targeting decisions that humans are effectively out of the loop. For example, a human may not have enough time to override a computer’s decision to fire on a target, or a single human operator may not be able to maintain adequate oversight of a swarm of dozens of unmanned aircraft. Some on-the-loop weapons could prove as dangerous to civilians as out-of-the-loop ones. Further study will be required to determine where to draw the line between acceptable and unacceptable autonomy for weaponized robots.³⁴⁷

344. See *infra* Section III.C.

345. *Losing Humanity*, *supra* note 8, at 46–47.

346. *Id.* at 46.

347. *Id.* at 46–47.

The report provides minimal support for the claim that humans “possess the ability to interpret targets’ actions more accurately [and] have better capacity for judging complex situations.”³⁴⁸ Humans may indeed be better than current machines at interpreting human intentions, given the role of context and perception.³⁴⁹ But that requires interactions involving visual observation—seeing the person you are shooting at—which the overwhelming majority of armed conflict does not involve.³⁵⁰

In terms of human versus machine in the ability to “judg[e] complex situations,” it depends on what “complex situation” means.³⁵¹ If the complexity involves nuanced human emotions and nonverbal gestures and cues, humans again are better equipped.³⁵² But in circumstances far more readily occurring in combat, machines collect and process far more information more quickly and accurately than humans.³⁵³ Consider, for example, the Phalanx, which identifies and assesses a range of variables including threat aircraft or missile range, angle of attack, and velocity; and does so in the rolling, open ocean.³⁵⁴

348. *Id.* at 46.

349. *See generally* Rob Sparrow, *Twenty Seconds to Comply*, 91 INT’L L. STUD. 699 (2015) (describing challenges an autonomous weapons system would have in accepting surrender). *But see* Alan Backstrom & Ian Henderson, *New Capabilities in Warfare: An Overview of Contemporary Technological Developments and the Associated Legal and Engineering Issues in Article 36 Weapons Reviews*, 94 INT’L REV. RED CROSS, no. 886, 2012, at 483 (discussing the tradeoffs between autonomous weapons system sensitivity and specificity).

350. JONATHAN B. A. BAILEY, *FIELD ARTILLERY AND FIREPOWER* (2004) (reporting that during WWII, artillery caused 51% of Soviet casualties, 60% of American casualties, 70% of German casualties, and 75% of British casualties). The majority of service-member casualties during WWII were caused by artillery, which is an indirect fire system. *Id.* The artillery crews loading and firing can’t see their target, which is usually miles away. *Id.* Projections of future warfare envision more decentralization and less “seeing” the enemy, in a physical sensory manner, than in prior conflicts. *See generally* STEVEN METZ, *ARMED CONFLICT IN THE 21ST CENTURY: THE INFORMATION REVOLUTION AND POST-MODERN WARFARE* (2000), http://www.au.af.mil/au/awc/awcgate/ssi/metz_info_rev.pdf.

351. *See Losing Humanity*, *supra* note 8, at 46.

352. *See* Sparrow, *supra* note 349, at 705 (describing how “*perception*—the ability to form a model of the world and to locate themselves within it based upon information from their sensors—that robots struggled with and that has constituted the main obstacle to [robot’s] use in more than a handful of roles”).

353. *See, e.g., infra* note 354 and accompanying text.

354. The Phalanx system consists of six major assemblies and components. *See* David Cela, *Correlation of Bullet Dispersion and Traverse Barrel Tip Displacement on a Firing Phalanx Gun System*, 1, 2, (Dec. 1994) (unpublished M.S. thesis, Naval Post Graduate School), <http://www.dtic.mil/dtic/tr/fulltext/u2/a294604.pdf>. The functions of just one of those six—the on-

In the second half of the recommendation to States, *Losing Humanity* claims the ban should extend to weapons with “such limited” human involvement as to render us effectively out of the loop.³⁵⁵ Yet the report at no point delineates the human control line.³⁵⁶

The recommendation provides that a “human operator may not be able to maintain adequate oversight of a swarm of dozens of unmanned aircraft.”³⁵⁷ This example may sound futuristic but it’s not.³⁵⁸ Nor is it meaningfully different than the reality of the last thirty-plus years wherein humans have supervised the conduct of any number of autonomous weapons systems that simultaneously identify and track multiple targets.³⁵⁹

Losing Humanity nonetheless calls for current weapons systems, which the report cannot specify, to be included in the ban.³⁶⁰ The recommendation ends by claiming that further study is required to know “where to draw the line.”³⁶¹ Thus, *Losing Humanity* simultaneously proposes a ban and proposes to determine the subject of the ban.³⁶² In contrast, the *SR Report* proposed a moratorium but still was no clearer than *Losing Humanity* on how to identify which weapons systems would be included.³⁶³

mount fire control assembly—include: “target search, detection and threat declaration, track acquisition, target track and measurement of range, velocity and angle, target prediction, lead angle computation, gun aiming and firing, projectile detection, measurement of projectile velocity and angle and gun aim bias correction.” *Id.* at 2–3.

355. *Losing Humanity*, *supra* note 8, at 46.

356. See generally *Losing Humanity*, *supra* note 8. Again, autonomy is not usefully thought of in levels, nor in linear fashion. See *supra* notes 85–89 and accompanying text.

357. *Losing Humanity*, *supra* note 8, at 46–47.

358. See Kris Osborn, *Air Force Developing Swarms of Mini-Drones*, DEFENCETECH (May 27, 2015), <http://www.defensetech.org/2015/05/27/air-force-developing-swarms-of-mini-drones/>.

359. This is certainly not a claim that because humans already have supervised autonomous weapons, that supervision was meaningful or advisable. See Osborn, *supra* note 358 and accompanying text. But the conversation on LAWS must include the fact that autonomous weapons systems are already in use. *Id.* Critique any or all them, hopefully with a degree of specificity in the critique; but ignoring them or trying to explain them away as something other than autonomous fails to correctly state or scope the problem, undermining the resulting answer or solution in the process. See *Losing Humanity*, *supra* note 8, at 46.

360. See *Losing Humanity*, *supra* note 8, at 5.

361. *Id.* at 47.

362. *Id.* at 46.

363. See *infra* notes 364–72 and accompanying text.

2. *SR Report's* Call for a Moratorium

The *SR Report* concludes by reinforcing but not supporting the moral panic fostered throughout.³⁶⁴ The report claims that LAWS “could have far-reaching effects on societal values, including fundamentally on the protection and the value of life and on international stability and security,” and “may denigrate the value of life itself.”³⁶⁵ And while acknowledging that it is foreseeable that LAWS could comply with international humanitarian law, two sentences later the *SR Report* refers to LAWS as “[t]ireless war machines, ready for deployment at the push of a button”³⁶⁶

Yet when the melodramatic language is stripped away, what remains is a report that doesn’t specify the weapons systems that should be subject to a moratorium.³⁶⁷ Like *Losing Humanity*, the *SR Report* doesn’t explain what should be subject to a moratorium, which renders the call functionally useless.³⁶⁸ Why the *SR Report* can’t explain what should be banned reflects the inherent flaw in attempting the ban.³⁶⁹

The *SR Report* recommends a moratorium on “at least the testing, production, assembly, transfer, acquisition, deployment and use of LARs until the time an internationally agreed upon framework on the future of LARs is established.”³⁷⁰ It’s an oddly specific call given the ambiguity of what it seeks to subject to a moratorium.³⁷¹ And this ambiguity, coupled with the ambiguity of *Losing Humanity*, has not facilitated constructive dialogue at CCW.³⁷²

364. See *SR Report*, *supra* note 3, ¶¶ 109–26.

365. *Id.* ¶ 109.

366. *Id.*

367. *Id.* ¶¶ 113–26.

368. *Id.*

369. See *infra* notes 370–72 and accompanying text.

370. *SR Report*, *supra* note 3, ¶ 113.

371. *Id.*

372. See *supra* note 42 and accompanying text; see also Crootof, *supra* note 42.

IV. CCW

In a relatively short period of time, The Campaign and the groups it represents have been extremely successful in prompting the States Parties to the CCW to consider LAWS.³⁷³ One need only view the UN's LAWS webpage to appreciate The Campaign's pride of place.³⁷⁴ The website acknowledges that the issue of LAWS was "first brought to the international community's attention by Human Rights Watch in its report titled '*Losing Humanity: The Case Against Killer Robots*.'"³⁷⁵ In bold letters, the website lists "The Campaign to Stop Killer Robots" and includes links to two videos The Campaign produced: a "short film explaining the background to LAWS and work being undertaken within the United Nations and civil society"³⁷⁶ and one on The Campaign's "work during the 2015 Meeting of Experts on LAWS."³⁷⁷ The latter video includes a message from the UN High Representative for Disarmament Affairs, "acknowledg[ing] the critical role . . . civil society, especially The Campaign to Stop Killer Robots, has played" in "driving international attention to this issue."³⁷⁸ Yet having driven the CCW States Parties to consider LAWS, collectively those countries are not anywhere close to adopting a CCW protocol banning

373. As an indirect indicator, when the head of the International Committee of the Red Cross's Arms Unit spoke on LAWS, she singled out The Campaign and the UN Special Rapporteur for playing "a very important role in highlighting the risks posed by the development of these weapons and the need for the international community to pay urgent attention to this issue." See Kathleen Lawand, *Fully Autonomous Weapons Systems*, ICRC (Nov. 25, 2013), <https://www.icrc.org/eng/resources/documents/statement/2013/09-03-autonomous-weapons.htm>.

374. See *Background*, *supra* note 41.

375. *Id.*

376. *Id.*; see Campaign to Stop Killer Robots, *Convention on Conventional Weapons*, YOUTUBE (Mar. 12, 2014), <https://www.youtube.com/watch?v=tCGidyqWwK&feature=youtu.be> [hereinafter YOUTUBE, *Convention on Conventional Weapons*].

377. *Background*, *supra* note 41; see also Campaign to Stop Killer Robots, *Second UN Meeting on Killer Robots*, YOUTUBE (May 9, 2015), <https://www.youtube.com/watch?v=8xcq3btFYdg&feature=youtu.be> [hereinafter YOUTUBE, *Second UN Meeting on Killer Robots*]. While the CCW website refers to the weapons systems at issue as LAWS, The Campaign videos continue to promote and advance the term "killer robots" by using the term in the title imbedded in the video—one YouTube title is the innocuous *Convention on Conventional Weapons* and the other YouTube title is *Second UN Meeting on Killer Robots* (despite the CCW not using that term). See YOUTUBE, *Convention on Conventional Weapons*, *supra* note 376; YOUTUBE, *Second UN Meeting on Killer Robots*, *supra*.

378. See YOUTUBE, *Convention on Conventional Weapons*, *supra* note 376; YOUTUBE, *Second UN Meeting on Killer Robots*, *supra* note 377.

LAWS—the decisive action The Campaign calls for.³⁷⁹

One possible reason is that attempting to preemptively ban fully autonomous weapons, which do not (and may not ever) exist, is arguably unprecedented.³⁸⁰ Efforts to ban cluster munitions in 2008³⁸¹ and landmines in 1996³⁸² were largely empirically based. Unlike with LAWS, there was no need to speculate as to the harm those weapons caused.³⁸³ And while there was a prospective element to the CCW Protocol on Blinding Lasers adopted in 1995, military lasers capable of blinding humans were already in use.³⁸⁴

And of course different States have different interests and motivations regarding whether to support a ban, oppose it, or defer a decision.³⁸⁵ International consensus is challenging in any area, but in framing LAWS in “killer robots” terms, The Campaign essentially undermined itself—the price paid for the successful marketing campaign has been obfuscation of the issues.

379. See generally *Background*, *supra* note 41.

380. Charli Carpenter, *Beware the Killer Robots*, FOREIGN AFF. (Jul. 3, 2013), <https://www.foreignaffairs.com/articles/united-states/2013-07-03/beware-killer-robots> (“This new movement [to ban LAWS] is unique amongst disarmament campaigns since the organizations are lobbying against a class of weapons that has not yet been widely deployed or shown to cause massive humanitarian harm. . . . [F]ew weapons have been banned preemptively based on the harm they *might* cause, precisely because it is difficult to make such a case on empirical grounds.”).

381. See *Convention on Cluster Munitions*, *supra* note 259 (providing general and background information).

382. See generally *Anti-personnel Landmine Convention*, UNITED NATIONS OFF. GENEVA, [http://www.unog.ch/80256EE600585943/\(httpPages\)/CA826818C8330D2BC1257180004B1B2E?OpenDocument](http://www.unog.ch/80256EE600585943/(httpPages)/CA826818C8330D2BC1257180004B1B2E?OpenDocument) (last visited Oct. 13, 2016).

383. Given their nature, already existing and employed land mines, cluster munitions, and other explosive remnants of war continue to maim and kill over 1,000 people a year. See Cluster Munition Coalition, *Casualties from Victim-Activated Improvised Explosive Devices in 2014*, LANDMINE & CLUSTER MUNITION MONITOR (Nov. 30, 2015), http://the-monitor.org/media/2155552/2015_IEDs_BriefingPaper.pdf; see also Charli Carpenter, *Beware the Killer Robots*, FOREIGN AFF. (Jul. 2 2013), <https://www.foreignaffairs.com/articles/united-states/2013-07-03/beware-killer-robots> (explaining the link between the “humanitarian toll” from landmines and cluster munitions, and the eventual bans of those weapons).

384. See Protocol on Blinding Laser Weapons (Protocol IV) to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects of October 10, 1980, *adopted* Oct. 13, 1995, T.I.A.S. No. 09-721.2 (entered into force July 21, 2009) [hereinafter Protocol IV].

385. See *The Problem*, *supra* note 9; see generally *Report of the 2014 Informal Meeting of Experts on Lethal Autonomous Weapons Systems (LAWS)*, UNITED NATIONS OFF. GENEVA (2014), [http://www.unog.ch/80256EDD006B8954/\(%20httpAssets\)/350D9ABED1AFA515C1257CF30047A8C7/\\$file/Report_AdvancedVersion_10June.pdf](http://www.unog.ch/80256EDD006B8954/(%20httpAssets)/350D9ABED1AFA515C1257CF30047A8C7/$file/Report_AdvancedVersion_10June.pdf) [hereinafter *2014 Meeting*] (demonstrating the different opinions held by the various delegations); Eveleth, *supra* note 32.

Because of the inability to reconcile potential killer robots with long-standing weapons systems capable of selecting and engaging targets without further human intervention, The Campaign has had to couch the ban in general terms.³⁸⁶ But this lack of specificity has (depending on one's perspective) either allowed or set the conditions for the international discussion to become circular, which is reflected in what has transpired at CCW since the treaty body addressed LAWS in 2013.³⁸⁷

In 2014, the majority of the debate was spent discussing how to define autonomy.³⁸⁸ Not only was no definition reached, a majority of the delegations thought it premature to even attempt one.³⁸⁹ As discussed *infra*, trying to precisely define autonomy does not seem possible.³⁹⁰ And the delegations further muddled the waters by suggesting that one indefinable concept—autonomy—might be thought of in reference to an almost equally indefinable concept—“meaningful human control.”³⁹¹ The 2015 CCW LAWS meeting chair described the resulting lack of consensus:

The term “meaningful human control” was raised frequently as a possible notion to advance the understanding of the nature of LAWS. However, several delegations expressed scepticism over the utility of “meaningful human control”, assessing it as being too vague, subjective and unclear. The term “human judgment” was proposed as an alternative. Some delegations held that when characterising LAWS, “autonomy” would be a more precise and appropriate technical term. Other delegations highlighted the concept of “critical functions” as potentially helpful in identifying

386. See H.E. Michael Biontino, *Meeting of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects*, ¶ 6 (Nov. 2015), <http://www.genf.diplo.de/contentblob/4665552/Daten/6038279/20151112berichtexpertlethal.pdf> [hereinafter *2015 Meeting*].

387. *2014 Meeting*, *supra* note 385.

388. *See id.*

389. *Id.* ¶ 17 (“The issue of a definition was raised by a number of delegations. While some suggested that a clarification would be necessary at a certain stage if more substantial work were to be undertaken, most of the delegations indicated that it was too early to engage in such a negotiation.”).

390. *See infra* Section V.A.1.

391. *2014 Meeting*, *supra* note 385, ¶ 20 (reporting that “[m]any interventions stressed that the notion of meaningful human control could be useful to address the question of autonomy”).

defining elements of LAWS.³⁹²

This trend continued in a November 2015 CCW LAWS meeting where delegates agreed to continue discussions without resolving any substantive issues or even reaching consensus as what those issues were.³⁹³

In the lead-up to the April 2016 CCW meetings, The Campaign assessed the decision to continue the LAWS discussion as “lack[ing] ambition, show[ing] no sense of urgency, and reflect[ing] the CCW’s usual ‘go slow and aim low’ approach.”³⁹⁴ The April meeting³⁹⁵ yielded a recommendation that the CCW States Parties establish a group of governmental experts who would meet in 2017 to “explore and agree on possible recommendations on options,” including a working definition of LAWS.³⁹⁶ Following the April 2016 meetings, The Campaign described the CCW process as proceeding, “but at a lacklustre pace.”³⁹⁷

Thus far, eleven CCW States Parties have agreed to The Campaign’s call for a ban.³⁹⁸ The vast majority of countries are either undecided or do not want to preemptively limit themselves in terms of weapons system development.³⁹⁹ For both of those groups—the undecided and the implicitly opposed—continuing discussions is desirable. Discussions may be genuinely useful to the former.⁴⁰⁰ To the latter category—first world nations

392. See generally *2015 Meeting*, *supra* note 386.

393. *Id.* at 5 (“There was a general understanding that the debate needs to be further deepened.”); *Report on Activities 2015*, CAMPAIGN TO STOP KILLER ROBOTS (Apr. 2015) http://www.stopkillerrobots.org/wp-content/uploads/2013/03/KRC_CCWx2015_Report_4June2015_uploaded.pdf.

394. *More Talks in 2016 but Little Ambition*, CAMPAIGN TO STOP KILLER ROBOTS (Nov. 13, 2015), <http://www.stopkillerrobots.org/2015/11/noambition/> [hereinafter *Little Ambition*].

395. In the interest of full disclosure, the author participated in and presented at the April 2016 meetings.

396. CHAIRPERSON OF THE INFORMAL MEETING, ADVANCED VERSION: RECOMMENDATIONS TO THE 2016 REVIEW CONFERENCE 1 (2016), [http://www.unog.ch/80256EDD006B8954/\(httpAssets\)/6BB8A498B0A12A03C1257FDB00382863/\\$file/Recommendations_LAWS_2016_AdvancedVersion+\(4+paras\)+.pdf](http://www.unog.ch/80256EDD006B8954/(httpAssets)/6BB8A498B0A12A03C1257FDB00382863/$file/Recommendations_LAWS_2016_AdvancedVersion+(4+paras)+.pdf). Thus, in 2017, some three years after the CCW took up the issue of LAWS, what LAWS are will yet again be a topic for international discussion. See *id.*

397. *Ban Support Grows*, *supra* note 39.

398. See *Chronology*, *supra* note 5. Among the fourteen States calling for ban, Egypt, Ghana and Zimbabwe are not States Parties to the CCW. *States Parties and Signatories*, UNITED NATIONS OFF. GENEVA, [http://www.unog.ch/80256EE600585943/\(httpPages\)/3CE7CFC0AA4A7548C12571C00039CB0C?OpenDocument](http://www.unog.ch/80256EE600585943/(httpPages)/3CE7CFC0AA4A7548C12571C00039CB0C?OpenDocument) (last updated June 21, 2016).

399. See generally *SR Report*, *supra* note 3.

400. See *Report on Activities 2015*, *supra* note 393 (noting that thirty-five countries expressed

already employing LAWS—continued discussions are a way those countries can monitor, influence, delay, and even prevent the process within the CCW construct.⁴⁰¹ These countries have little interest in banning their own weapons systems, so CCW discussions *ad infinitum* are perfectly acceptable.⁴⁰² Consider how receptive the United States delegation was (and is) to the LAWS discussion within CCW:

We continue to believe that CCW, an IHL forum with its mix of policy, military and technical experts, is the right venue to consider this complex and important topic. This subject requires the in depth discussions we have seen at our first two meetings of experts, and we strongly support continuing these discussions next year. We were pleased with the level of participation in the informal meeting of experts but it is clear that this discussion is still in the early stages and further work is required to help shape our understanding of this future technology.⁴⁰³

Despite this, or more accurately, because of this stalled state of affairs, there is an opportunity to reframe the called for ban.⁴⁰⁴ And while seemingly counterintuitive, this restructuring provides practical and strategic advantages to both The Campaign and First World States Parties to CCW.⁴⁰⁵

V. PROPOSAL

Calling for a preemptive ban of future weapons indistinguishable from extant systems has not worked.⁴⁰⁶ I propose a moratorium, not of LAWS

their views on LAWS and their continued willingness to discuss the issue, including first-world nations).

401. See generally *id.*

402. See generally Carpenter, *supra* note 380 (asserting that it is arguably unprecedented to fully ban autonomous weapons).

403. Michael A. Meier, *The Meeting of the High Contracting Parties to the Convention on the Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects* 2 (Nov. 12, 2015), [http://www.unog.ch/80256EDD006B8954/\(httpAssets\)/FF19585DF8C9D410C1257F0F003B6702/\\$file/usa.pdf](http://www.unog.ch/80256EDD006B8954/(httpAssets)/FF19585DF8C9D410C1257F0F003B6702/$file/usa.pdf).

404. See *infra* Part V.

405. See *SR Report*, *supra* note 3.

406. See *2015 Meeting*, *supra* note 386, at 3.

writ large, but of a subset, LAWS primarily designed to lethally target personnel.⁴⁰⁷ The moratorium places the autonomy focus where it should be, on the critical functions of targeted selection and engagement.⁴⁰⁸ How a weapons system is characterized overall—automated, automatic, or autonomous—does not seem nearly as significant as whether it is capable of selecting and engaging targets without further human intervention.⁴⁰⁹ If a weapon is so capable and it's primarily designed to lethally target personnel, it is within the ambit of the proposed regulation.⁴¹⁰ This kind of a moratorium has practical and strategic advantages.⁴¹¹

A. *Practical Advantages of a Limited Moratorium*

1. Feasibility

The Campaign's current proposed ban would encompass some portion of LAWS that over thirty countries have employed for thirty years.⁴¹² This poses a staggering obstacle.⁴¹³ And it has prompted largely unproductive efforts by both The Campaign and States Parties to parse out automated and automatic from autonomous, despite those delineations being unclear.⁴¹⁴ Yet the extant systems are almost all anti-material, and they target munitions, aircraft, and ships—though as previously discussed, with indirect but lethal outcomes to the human crews.⁴¹⁵ Concern about killer robots would seem to be about LAWS directly targeting humans with lethal force.⁴¹⁶

407. See *Report on Activities 2016*, CAMPAIGN TO STOP KILLER ROBOTS (Apr. 2016), http://www.stopkillerrobots.org/wp-content/uploads/2013/03/KRC_CCWx2016_Jun27upld-1.pdf.

408. See *Losing Humanity*, *supra* note 8, at 1; see generally *2015 Meeting*, *supra* note 386.

409. *SR Report*, *supra* note 3, at 1; see also *2015 Meeting*, *supra* note 386, at 3 (“[S]ystems tasked with making decisions on life and death without any human intervention, were they to be developed, would be in breach of international humanitarian law (IHL), unethical and possible even pose a risk to humanity itself.”).

410. See generally *SR Report*, *supra* note 3.

411. See *infra* Section V.A–B.

412. See generally *The Solution*, *supra* note 7.

413. See *supra* note 290 and accompanying text.

414. See *supra* Part I; see generally *2015 Meeting*, *supra* note 386 (“Some delegations held that when characterising LAWS, ‘autonomy’ would be a more precise and appropriate term.”).

415. *Losing Humanity*, *supra* note 8, at 7; *2015 Meeting*, *supra* note 386.

416. See Christof Heyns, *Autonomous Weapon Systems: Human Rights and Ethical Issues—Talking Points at Meeting of High Contracting Parties to the Convention on Certain Conventional*

Seeking to ban LAWS writ large is overbroad, given the long-standing use of anti-material LAWS.⁴¹⁷ A moratorium on LAWS primarily designed to target personnel would reach the gravamen of the concern of LAWS killing people, while avoiding the challenges posed by attempting to ban pre-existing systems.⁴¹⁸

The proposed moratorium would of course not resolve autonomy's definitional problems, because they aren't solvable.⁴¹⁹ But it would remove the current motivation to try to differentiate extant systems as automatic or automated.⁴²⁰ Instead, the proposed moratorium would focus the inquiry on: (1) whether the weapons system is primarily designed to target personnel and (2) whether it is capable of selecting and engaging targets without human intervention.⁴²¹ These questions help identify the weapons systems seemingly at issue—those most likely to cause human injury or death, and not because a human launched or fired the weapon.⁴²² Yet the framing of the current debate has generated efforts designed to preserve an intellectual coherence to the called-for ban.⁴²³ This has unfortunately come at the expense of losing or diluting the focus on weapons systems causing human injury or death.⁴²⁴

The proposed moratorium offers advantages to both The Campaign and CCW States Parties. With the current ban proposal on LAWS writ large, all sides are incentivized to focus on a weapons systems' overall categorization

Weapons, UNITED NATIONS OFF. GENEVA (Apr. 14, 2016), [http://www.unog.ch/80256EDD006B8954/\(httpAssets\)/205D5C0B0545853BC1257F9B00489FA3/\\$file/heyms+CCW+2016+talking+points.pdf](http://www.unog.ch/80256EDD006B8954/(httpAssets)/205D5C0B0545853BC1257F9B00489FA3/$file/heyms+CCW+2016+talking+points.pdf) [hereinafter *AWS*]. At the 2016 CCW LAWS Experts Meeting, Christof Heyns, the UN Special Rapporteur on Extrajudicial, Summary, or Arbitrary Executions and author of the *SR Report*, suggested that the international community's focus be broader than lethal autonomous weapons systems and proposed "AWS" for autonomous weapons systems. *Id.* For the Special Rapporteur, AWS would allow for consideration of law enforcement use of non-lethal systems. *Id.*

417. See *supra* note 34 and accompanying text.

418. See discussion *supra* Part III.

419. See discussion *supra* Part IV.

420. See generally *AWS*, *supra* note 416; see also *supra* Part I.

421. See *AWS*, *supra* note 416, ¶ 3.

422. See *id.*; *supra* note 416.

423. See generally *2015 Meeting*, *supra* note 386; *Report on Activities 2016*, *supra* note 407 (noting that ninety-four countries participated in the 2016 discussion on preserving an intellectual coherence to the ban); *supra* Section III.C.

424. See *supra* Sections III.C, Part IV and accompanying text.

and for it to be something other than autonomous.⁴²⁵ The overall categorization borders on irrelevant⁴²⁶—what matters is a weapons system’s capability to select and engage targets without human intervention.⁴²⁷ Thus, if a State has an *automated* weapons system that selects and engages humans without human intervention, it would not be covered by a LAWS ban.⁴²⁸ This would be the outcome with even a sentry robot primarily designed to target humans, as long as it is labeled automated. While that reflects the current, albeit dysfunctional, state of affairs, to which constituency does this superficial avoidance belong: constructive or progressive?

The proposed moratorium would only cover anti-personnel LAWS.⁴²⁹ This would likely include systems like South Korea’s⁴³⁰ and Israel’s⁴³¹ sentry

425. See *supra* note 347 and accompanying text (emphasizing the ban on the entire category of autonomous lethal weapons systems). The Campaign is incentivized because the alternative is that extant systems long in controversial use by thirty countries and costing billions would be covered by the ban, rendering the ban unfeasible. See *supra* Section III.B.C. And States Parties of course don’t want already developed weapons systems to be the subject of a ban. See *id.*

426. This is another way of referencing the autonomy delta between full autonomy and the capability to select and engage targets without further human intervention. See *supra* notes 136–38 and accompanying text; see also *supra* Figure 1. As previously discussed, it seems impossible to discuss the harm posed by that delta without crossing into science fiction. See *supra* notes 136–38 and accompanying text. Imagine two sentry-styled weapons systems. See *supra* Figures 2 & 3. System A autonomously performs a number of functions, plugs itself in, loads ammunition, cleans itself, and repairs itself. See *supra* Figure 1. But it is essentially a next generation Boomerang system, meaning that while it detects and acquires targets, System A does not engage. See generally *supra* note 164. System B is the opposite: humans plug it in, load, clean, and repair it. See *supra* Figure 3. But System B detects, acquires, and engages targets. How is B not the focus of our concern? Of the functions associated with System B, humans perform many of them. Thus, to the extent we are compelled to label B, it is fair to say that overall it is something other than autonomous. Yet this demonstrates the relative insignificance of this overall categorization and of machine autonomy outside of critical functions like engaging.

427. See Crotoft, *supra* note 42, at 1850 (“[D]istinctions between ‘non-autonomous’ and ‘autonomous weapon systems . . . are irrelevant when constructing a regulatory treaty’s definition—usually because they fail to account for the level of human involvement in the decision to use lethal force.’”).

428. See *id.* Presumably the authors of both *Losing Humanity* and the *SR Report* would point to sections of their respective documents where they indicate that some forms and types of automatic weapons would or should be covered by their proposed ban or moratorium. But as discussed, neither report can differentiate which extant systems would fall under the regulation and why. See also *supra* Part I. And the lack of specificity in the reports is certainly not from a lack of effort or concern. But at this point in time, if we can’t provide answers as to how to classify thirty-year weapons systems, we need to rethink and reword the questions.

429. See *infra* notes 430–35 and accompanying text.

430. Loz Blain, *South Korea's Autonomous Robot Gun Turrets: Deadly from Kilometers Away*, NEW ATLAS (Dec. 7, 2004), <http://newatlas.com/korea-dodamm-super-aegis-autonomos-robot-gun->

robots and some that Russia⁴³² and China⁴³³ are purportedly developing.⁴³⁴ Those countries may continue to try to parse out the definition of autonomy, but definitional intransigence from those four countries is far less an obstacle than the status quo.⁴³⁵

Finally, the proposed moratorium could be agreed to much more quickly than the LAWS discussions to date.⁴³⁶ And time does not appear on The Campaign's side.⁴³⁷ Right now the CCW discussions to "explore . . . possible recommendations on options" are anticipated to occur in 2017 and 2018.⁴³⁸ Even if one of the recommendations, which would have to be reached by consensus, was that a LAWS protocol to CCW be negotiated, it's hard to envision that occurring before 2019 at the earliest. As The Campaign reiterated at the April 2016 meetings, its concern is on future weapons systems.⁴³⁹ But the longer the CCW discussions continue, the greater the number of weapons that once were future concepts will be developed into extant systems.⁴⁴⁰ Thus, systems developed in 2017, 2018, and 2019 would not be covered by a protocol negotiated in 2019 that applies

turret/17198/ (previewing South Korea's plans for ground-based LAWS at the Demilitarized Zone dividing North and South Korea).

431. Noah Schactman, *Robo-Snipers, "Auto Kill Zones" to Protect Israeli Borders*, WIRED (June 4, 2007), http://www.wired.com/2007/06/for_years_and_y/ (describing Israeli efforts, almost ten years ago, to develop LAWS capable of performing ground sentry or security functions, including employing lethal force).

432. See Patrick Tucker, *The Pentagon is Nervous about Russian and Chinese Killer Robots*, DEFENSE ONE (Dec. 14, 2015), <http://www.defenseone.com/threats/2015/12/pentagon-nervous-about-russian-and-chinese-killer-robots/124465/?oref=d-dontmiss> (describing U.S. concerns about Russia potentially developing all robotic military units).

433. See Jeffrey Lin & P.W. Singer, *China's New Trio of Urban Combat Robots*, POPULAR SCI. (Dec. 10, 2015), <http://www.popsoci.com/chinas-new-triple-team-fighting-robots> (detailing China's efforts to develop LAWS for ground, urban fighting).

434. See ICRC REPORT, *supra* note 24 ("[T]here are some existing anti-personnel weapon systems that have autonomous modes, such as so called 'sentry weapons.'").

435. See *generally Background*, *supra* note 41.

436. See *supra* notes 396–403 and accompanying text.

437. See *supra* notes 396–403 and accompanying text.

438. See *supra* note 396 and accompanying text.

439. See 2016 Expert Meeting on Laws, *Recommendations to the 2016 Review Conference Submitted by the Chairperson of the Informal Meeting of Experts*, UNITED NATIONS OFF. GENEVA (Apr. 2016), [http://www.unog.ch/80256EE600585943/\(httpPages\)/37D51189AC4FB6E1C1257F4D004CAFB2?OpenDocument](http://www.unog.ch/80256EE600585943/(httpPages)/37D51189AC4FB6E1C1257F4D004CAFB2?OpenDocument).

440. See, e.g., Harriet Grant, *UN Delay Could Open Door to Robot Wars, Say Experts*, GUARDIAN (Oct. 6, 2015), <https://www.theguardian.com/science/2015/oct/06/autonomous-weapons-un-delay-robot-wars>; *supra* notes 396–403 and accompanying text.

to future systems.⁴⁴¹

2. Consistent with CCW Regime

A primary purpose moratorium would also be consistent with other CCW efforts to regulate weapons systems.⁴⁴² For example, Protocol I to CCW, which regulates non-detectable fragments, prohibits the “use [of] any weapon the primary effect of which is to injure by fragments which in the human body escape detection by X-rays.”⁴⁴³ In similar fashion, Protocol III, which regulates incendiary weapons, defines them as “any weapon or munition which is primarily designed to set fire to objects or to cause burn injury to persons through the action of flame, heat, or combination thereof, produced by a chemical reaction of a substance delivered on the target.”⁴⁴⁴ Thus, those protocols prohibit a subset of a broader category of weapons based on their primary purpose.⁴⁴⁵

To be clear, a moratorium on LAWS primarily designed to target personnel does not mean that LAWS will not kill humans.⁴⁴⁶ Anti-material LAWS could, and as previously discussed, already have killed humans.⁴⁴⁷ For example, the pilots of aircraft were shot down by Patriot missile batteries operating in an autonomous mode and South African soldiers were killed by the malfunctioning anti-aircraft cannon.⁴⁴⁸ And the same would happen for navy-based LAWS targeting other ships—while the ship is the

441. *Id.*; see generally *Chronology*, *supra* note 5. The more that increasingly autonomous weapons systems are fielded in the next couple of years and thus are not covered by a ban on “future” systems, the greater the challenge will be to parse out and explain which LAWS would be subject to regulation.

442. See *infra* notes 443–45 and accompanying text.

443. Protocol on Non-Detectable Fragments (Protocol I) to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects of October 10, 1980, *adopted* Oct. 10, 1980, 19 I.L.M. 1529 [hereinafter Protocol I].

444. See Protocol on Prohibitions or Restrictions on the Use of Incendiary Weapons (Protocol III) to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects of October 10, 1980, *adopted* Oct. 10, 1980, T.I.A.S. No. 09-721.1 (entered into force July 21, 2009) [hereinafter Protocol III].

445. See *supra* notes 443–45 and accompanying text.

446. See generally *supra* Section II.B.

447. See *supra* Section II.B.

448. See *supra* note 156 and accompanying text.

target, the crews would be injured or killed.⁴⁴⁹ Assuming use consistent with international humanitarian law, ground-based, anti-material LAWS would not violate the proposed moratorium either.⁴⁵⁰

The proposed moratorium would allow the employment of LAWS primarily designed to be anti-material but capable of being employed against personnel.⁴⁵¹ Indeed, this point as applied to CCW's Protocol III on incendiary weapons is a source of considerable controversy.⁴⁵² Because white phosphorous is primarily designed to generate billowing smoke to obscure or signal, its use against personnel is not prohibited by Protocol III.⁴⁵³ Yet while some would like to revise, and, in their view, strengthen Protocol III, its adoption was nonetheless a positive step towards limiting the harmful effects of armed conflict.⁴⁵⁴ Thus, the proposed moratorium on LAWS primarily designed to target personnel would also be an incomplete and imperfect step, but a step nonetheless. In comparison to what little has been accomplished thus far, a partial step seems progress indeed.

449. As previously discussed, there was an incident involving the system of one US warship firing into another US warship, fortunately without serious injury. See *supra* notes 150–55 and accompanying text.

450. The ground-based system would either need to be capable of appropriate levels of distinction or used under circumstances where it was only directed at belligerent material, such as trucks or tanks. See Schmitt, *supra* note 43 (explaining the difference between weapons prohibited per se and other weapons for which certain uses or employments are prohibited; thus, simply because a ground-based LAWS may not be capable of the requisite levels of distinction, its use is not necessarily illegal).

451. See *supra* note 450 and accompanying text.

452. *From Condemnation to Concrete Action: A Five-Year Review of Incendiary Weapons*, HUMAN RTS. WATCH (Nov. 5, 2015), <https://www.hrw.org/news/2015/11/05/condemnation-concrete-action-five-year-review-incendiary-weapons> [hereinafter *From Condemnation to Concrete Action*] (proposing a plan by which to revise and in the view of HRW, improve CCW Protocol III).

453. W. Hays Parks, *The Protocol on Incendiary Weapons*, 279 INT'L REV. RED CROSS 535, 544 (1990); see also *From Condemnation to Concrete Action*, *supra* note 452.

454. *From Condemnation to Concrete Action*, *supra* note 452.

B. Strategic Advantages of a Limited Moratorium

1. Moratorium

The proposal is a moratorium, not a ban.⁴⁵⁵ Given that it is unknown how technology will or will not advance, a ban seems premature.⁴⁵⁶ And as the international community has demonstrated, the finality of a ban, coupled with the lack of empirical evidence of harm, has proven a tough sell.⁴⁵⁷ Moratoriums have the advantage of scalability, later becoming a ban or alternatively, if technology mitigates the LAWS concerns, the moratorium could be lifted.⁴⁵⁸

2. Modify the Optics

The manner by which The Campaign has framed the issue has allowed and possibly partially caused CCW States Parties to confusingly discuss the issue, mostly talking past each other in the process.⁴⁵⁹ Currently, it is perfectly reasonable for CCW States Parties to claim they are not sure what is meant by LAWS, and that further discussion is needed.⁴⁶⁰ While the proposed moratorium would not eliminate those challenges, its specificity

455. Another commentator, while approaching LAWS quite differently, argued that regulation, not a ban, is more likely to reduce human suffering. See John Lewis, *The Case for Regulating Fully Autonomous Weapons*, 124 YALE L.J. 1309, 1310 (2015). To that end, Lewis looked to and drew from the landmine convention. See *id.*

456. See Marco Sassòli, *CCW Meeting of Experts on Lethal Autonomous Weapons Systems* (May 14, 2014) (unpublished powerpoint) (inquiring into what sorts of technological innovations will be developed). And the ICRC has not joined the call to ban LAWS. See Lawand, *supra* note 373 (stating that the ICRC was not joining the call for a moratorium “at this time”). While that statement was temporally qualified with “at this time,” Ms. Lawand spoke over two years ago and the ICRC has still not joined the call. See *Autonomous Weapon Systems*, INT’L COMMITTEE RED CROSS (Nov. 12, 2014) (“The ICRC has not joined these calls *for now*.”) (emphasis added). Perhaps that’s because, as one commentator noted, “[i]f there is one thing we can predict about technological innovation, it is that it proceeds unpredictably. The potential for autonomous weapons is too immense, and the implications for the future of warfare too important to be assumed away or to remain unexplored.” Michael S. Newton, *Back to the Future: Reflections on the Advent on Autonomous Weapons Systems*, 5 CASE W. RES. J. INT’L L. 5, 23 (2015).

457. See *supra* Section III.C.

458. See *SR Report*, *supra* note 3, ¶ 111.

459. See Crootoof, *supra* note 42, at 1841.

460. Cf. *Losing Humanity*, *supra* note 8, at 12.

and anti-personnel focus makes it harder for States Parties to claim confusion, request more discussion, or avoid taking a position.⁴⁶¹ Few states (other than the four previously discussed) will want to publicly oppose a moratorium tailored to focus on LAWS primarily designed to target people.⁴⁶² And because the moratorium would actually be about autonomous systems for which the primary purpose is to target humans, The Campaign could more legitimately employ the terms “killer robot.”⁴⁶³

3. Best Alternative to the Negotiated Agreement

It is the First World CCW States Parties that won't but should welcome this proposal for a variety of reasons.⁴⁶⁴ As already discussed, the proposal is a moratorium, not a ban.⁴⁶⁵ So the United States, United Kingdom, and other countries can continue to develop and employ anti-material LAWS as they have been.⁴⁶⁶ And agreeing to temporarily forego something they have no intention of doing—developing LAWS primarily designed to target personnel—is not a huge ask.⁴⁶⁷

The proposal also ensures that the LAWS discussion stays within CCW, where States Parties can continue to participate and monitor.⁴⁶⁸ Importantly, for First World CCW States Parties, the proposed moratorium may represent the best alternative to a negotiated agreement.⁴⁶⁹ While the majority of the First World seems content to continue discussing LAWS but not more for

461. See *supra* Section V.A.

462. See Eveleth, *supra* note 32 (“[N]o government wants to be seen as pro-killer robot.”).

463. See *id.*

464. See generally *supra* note 6 and accompanying text.

465. See *supra* note 455 and accompanying text.

466. See Schmitt, *supra* note 43, at 35 (concluding that developing autonomous weapons systems is not unlawful “per se”).

467. See Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decision Under Risk*, 47 *ECONOMETRICA*, no. 2, Mar. 1979, at 263–91 (describing prospect theory and the idea that people don't miss what they never had).

468. Cf. *SR Report*, *supra* note 3, ¶ 112.

469. WILLIAM L. URY & ROGER FISHER, *GETTING TO YES: NEGOTIATING AGREEMENT WITHOUT GIVING IN* 99–108 (Bruce Patton ed., Penguin Books 3d ed. 2011) (introducing the concept of the Best Alternative To The Negotiated Agreement (BATNA)—that one's attitude and approach towards a negotiation should depend on the viability of alternatives to the negotiation). Understanding the differing BATNAs in the LAWS context is important. Western First World States Parties to the CCW should recognize the potential strength of The Campaign's BATNA in circumventing CCW.

the foreseeable future, The Campaign's patience is wearing thin.⁴⁷⁰ And The Campaign's frustration was likely exacerbated by being excluded from a portion of the November 2015 CCW LAWS meeting.⁴⁷¹ While the First World has a degree of control and influence within CCW, what if the discussions shifted outside that process?⁴⁷² What countries like the United States should worry about is that The Campaign may lobby a small number of states outside the CCW process to meet and discuss LAWS. Assume arguendo, the meetings take place not in Geneva and through CCW, but in Mexico City,⁴⁷³ and the result of a series of meetings of like-minded countries and NGOs is the Mexico Declaration or the Mexico Convention—a ban on LAWS more broadly. While that instrument would only be binding on signatory states, as an international law *fait accompli*, it could gain momentum through moral force and increased signatories.⁴⁷⁴ This is similar to what happened with the Convention on Cluster Munitions—the result of

470. See Steven Gross, *The U.S. Should Oppose the U.N.'s Attempt to Ban Autonomous Weapons*, HERITAGE FOUND. (Mar. 5, 2015), <http://www.heritage.org/research/reports/2015/03/the-us-should-oppose-the-uns-attempt-to-ban-autonomous-weapons>. On one level The Campaign's frustration is misplaced. While NGOs and civil society play an important role, ultimately States, not NGOs, determine international law. *Id.* But,

[a]lthough sovereign states have the final say at meetings of the CCW and in ad hoc treaty negotiating forums, previous NGO campaigns—organized, funded and led by some of the same NGOs seeking to ban LAWS—have played a significant role in efforts to ban other “controversial” weapons. . . . Indeed, the current NGO campaign against LAWS is modeled on the success of past campaigns conducted by the very same NGOs.

Id. And while obviously interested in CCW Protocol prohibiting LAWS, The Campaign has stated that they “support any action to urgently address fully autonomous weapons in any forum. The decision to begin work in the [CCW] does not prevent work elsewhere, such as the Human Rights Council.” *Nations Agree*, *supra* note 6.

471. *Little Ambition*, *supra* note 394 (describing how The Campaign's representatives “were told to leave an informal consultation [at CCW] in 2016. This came after the United Kingdom objected to their presence. No state supported the UK's request, but the chair asked [all] NGOs to leave.”).

472. Shifting outside CCW includes the possibility of the LAWS discussion returning to the Human Rights Council, which the Special Rapporteur may have suggested by implication when proposing the term AWS and evaluating less than lethal autonomous systems used by police outside of armed conflict. See *AWS*, *supra* note 416.

473. The key to this possible outcome would seem to be a couple of European States joining the efforts, with northern European countries the most likely candidates.

474. Once such a process has concluded, the only question for the remaining States that did not participate in the process is whether to sign or accede, because the opportunity to influence the content of the text will have passed. States, like the United States and the United Kingdom, would be in a difficult position, particularly if the “Mexico Convention” prohibited reservations, understandings, and declarations through which States may otherwise influence a treaty, at least as applied to them.

the Oslo process, which the UN describes as “a diplomatic process that includes States, civil society, the International Committee of the Red Cross as well as the United Nations.”⁴⁷⁵

With each CCW LAWS meeting that determines only to hold another meeting and continue discussions, the Western First World assumes a strategic risk that The Campaign will leverage a similar “diplomatic process” on LAWS outside the CCW process.⁴⁷⁶ From the perspective of most CCW States Parties, to better ensure the ability to influence the LAWS discussion, the conversation needs to remain in CCW. And a moratorium on LAWS primarily designed to target personnel would facilitate just that.

CONCLUSION

Advances in autonomy will, indeed already are, heralding a technological revolution.⁴⁷⁷ Driverless cars,⁴⁷⁸ the prospect of Amazon delivering packages via largely autonomous aerial delivery systems,⁴⁷⁹ and endless other applications are now being used or developed.⁴⁸⁰

475. See generally *Convention on Cluster Munitions*, UNITED NATIONS OFF. GENEVA (May 30, 2008), [http://www.unog.ch/80256EE600585943/\(httpPages\)/F27A2B84309E0C5AC12574F70036F176?OpenDocument](http://www.unog.ch/80256EE600585943/(httpPages)/F27A2B84309E0C5AC12574F70036F176?OpenDocument)) (describing the “Oslo process”).

476. See generally CCW Website, *supra* note 6.

477. See Peter Singer, *The Robotics Revolution*, BROOKINGS INST. (Dec. 11, 2012), <https://www.brookings.edu/opinions/the-robotics-revolution/>.

478. Daisuke Wakabayashi & Brian X. Chen, *Apple is Said to Be Rethinking Strategy on Self-Driving Cars*, N.Y. TIMES (Sept. 9, 2016), <http://www.nytimes.com/2016/09/10/technology/apple-is-said-to-be-rethinking-strategy-on-self-driving-cars.html> (detailing that “automakers like Ford, General Motors and Fiat Chrysler have all said they expect to put a number of self-driving vehicles on the road in five years or less”). While revising this article in September 2016, the ride-sharing company Uber conducted tests in Pittsburgh, Pennsylvania involving largely autonomous vehicles (and no driver). Cecilia Kang, *No Driver? Bring It On—How Pittsburgh Became Uber’s Testing Ground*, N.Y. TIMES (Sept. 10, 2016), <http://www.nytimes.com/2016/09/11/technology/no-driver-bring-it-on-how-pittsburgh-became-ubers-testing-ground.html>.

479. See Nicky Woolf & Samuel Gibbs, *Amazon to Test Drone Delivery in Partnership with UK Government*, GUARDIAN (Jul. 25 2016), <https://www.theguardian.com/technology/2016/jul/25/amazon-to-test-drone-delivery-uk-government>.

480. To illustrate the seemingly endless possibilities flowing from increased autonomy, consider that Australia may soon deploy the Cetusbot, a largely autonomous “killer robot,” capable of selecting and killing starfish (specifically the reef killing crown of thorns starfish). Michael Slezak, *Can This Starfish-Killing Robot Save the Great Barrier Reef?*, NEW SCIENTIST (Jan. 13, 2016), <https://www.newscientist.com/article/mg22930560-700-can-this-starfish-killing-robot-save-the-great-barrier-reef/>.

There has never been a time in history where military and weapons systems were wholesale excluded from society-altering technological advances like those created by increases in autonomy.⁴⁸¹ And while a wholesale ban is impossible because militaries have employed LAWS for decades, that's the essence of The Campaign's proposed ban.⁴⁸²

The LAWS debate is proving a proxy for broader technology⁴⁸³ and morality questions.⁴⁸⁴ And while those questions are fairly asked and debated, in terms of the LAWS, the CCW discussions will not benefit nor ever progress from yet another circular lap mired in attempts to define the indefinable and framed by speculative future fears.⁴⁸⁵ The international community needs to exit the cul-de-sac into which The Campaign has so quixotically compelled its entry.⁴⁸⁶ There are many ways to exit,⁴⁸⁷ and this article attempts to offer one possibility. But the first and most important step is to recognize the circular nature of the LAWS discussion to date.

481. See generally Sharkey, *supra* note 92.

482. See *supra* Part I.

483. Bryan Appleyard, *The New Luddites: Why Former Digital Prophets Are Turning Against Tech*, NEW REPUBLIC (Sept. 5, 2014), <https://newrepublic.com/article/119347/neo-luddisms-tech-skepticism>.

484. See *Autonomous Weapon Systems: Is it Morally Acceptable for a Machine to Make Life and Death Decisions?*, *supra* note 134.

485. See generally *supra* Part III.

486. See *supra* note 52–55 and accompanying text.

487. Most certainly not referring to this article, but to the hope that after two years of informal discussions CCW States Parties will remain open to other ways to approach the issue, U.S. Supreme Court Justice Felix Frankfurter's advice that "[w]isdom too often never comes, and so one ought not to reject it merely because it comes late," seems apt. *Henslee v. Union Planters Nat'l Bank & Tr. Co.*, 335 U.S. 595, 600 (1949) (Frankfurter, J., dissenting).